

## Traffic Impact Analysis Royal Farms #430 US Rte. 17 & Commerce Pkwy Stafford County, Virginia

Prepared for:

**Sumner Partners LLC**

Prepared September 11<sup>th</sup>, 2020

# Traffic Impact Analysis

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Prepared September 11<sup>th</sup>, 2020

Prepared for:  
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- Appendix B: Scope of Work
- Appendix C: Traffic Volume and Traffic Distribution Exhibits
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- Appendix G: Mitigated (2022) Capacity Analysis

## **Executive Summary**

This report summarizes the findings of the Traffic Impact Analysis performed by Bowman Consulting Group (BCG) for the proposed Royal Farms Convenience Store and Gas Station located at the SW corner of the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive in Stafford County, Virginia.

The purpose of this analysis is to determine the potential impact (if any) to the existing traffic operations of the surrounding roadway network caused by the proposed development.

### **Description of Proposed Development**

The applicant is proposing to develop the site with a 5,154 SF Convenience Store and Gas Station with 16 vehicle fueling positions. The proposed development is expected to replace an abandoned equipment rental store.

Access to the site will be provided via one previously approved driveway and one existing driveway. The approved driveway is a right-in only driveway connecting to US. Rte 17 (Driveway 1) and the existing driveway is a full-access driveway connecting to Commerce Parkway (Driveway 2).

### **Scope of Work**

A scoping meeting for the proposed development was held on August 5, 2020 with members of Stafford County and the Virginia Department of Transportation (VDOT). The purpose of this meeting was to discuss and agree upon major components of this study, including the study intersections below:

- US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive
- US Rte. 17 and Proposed Site Driveway (Driveway 1; previously approved)
- Commerce Parkway and Proposed Site Driveway (Driveway 2; existing)

Since traffic data could not be collected at the study intersections due to the COVID-19 outbreak, VDOT and the County agreed for BCG to use traffic data from 2017.

The proposed development is expected to generate 112 net primary trips during the morning peak hour and 92 net primary trips during the evening peak hour. The proposed development (ITE Land Use 960) is expected to have a pass-by percentage of 76% for the morning and evening peak hours.

For the purposes of this analysis, it is anticipated that the proposed development will be constructed and fully operational by the year 2022. The following scenarios were evaluated as part of this study:

- Existing Conditions (2020)
- Future Conditions (2022) without the proposed development (No Build)
- Future Conditions (2022) with the proposed development (Build)

## Capacity Analysis Results

### 2022 Build Scenario

- To evaluate the traffic operations for year 2022, intersection capacity analyses were completed. With the addition of anticipated trips from the proposed development, the results indicate the following:
  - US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive
    - Under Build Conditions, the intersection is projected to experience an increase in overall delay of 12.9 seconds during the morning peak hour and 35.3 seconds during the evening peak hour.
    - During the morning peak hour, the intersection is projected to operate at an acceptable overall LOS C during No Build Conditions, decreasing to an acceptable overall LOS D during Build Conditions.
    - During the evening peak hour, the intersection is projected to operate at an acceptable overall LOS D during No Build Conditions, decreasing to an overall LOS E during Build Conditions.
  - Commerce Parkway and Driveway 2
    - During the morning and evening peak hours, the results of the analysis indicate that there is no significant increase in overall delay with the addition of the proposed development's site traffic.
    - The intersection is projected to operate at an acceptable overall LOS A during both morning and evening peak hours during Build Conditions.
  - US Rte. 17 and Driveway 1
    - During the morning and evening peak hours, the results of the analysis indicate that there is no significant increase in overall delay with the addition of the proposed development's site traffic.
    - The intersection is projected to operate at an acceptable overall LOS A during both morning and evening peak hours during Build Conditions.

## 2022 Mitigated Scenario

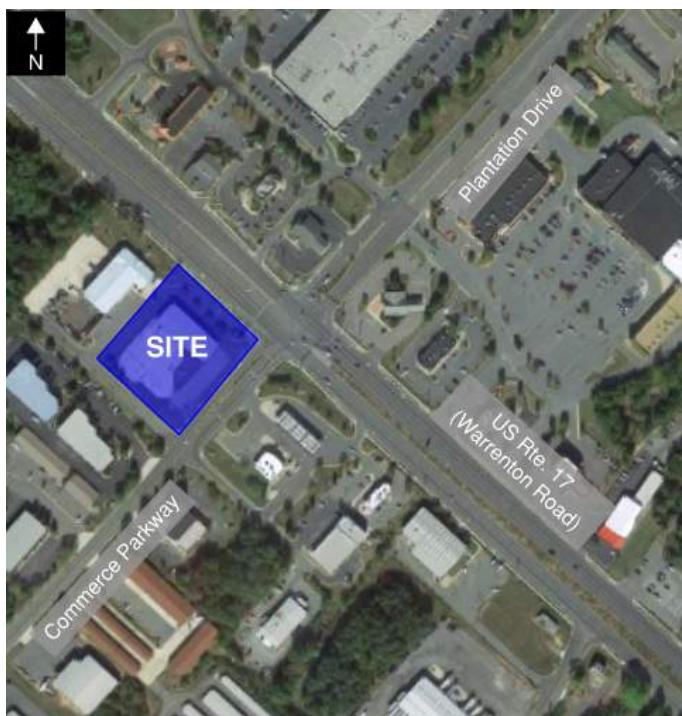
- Due to the capacity constraints projected at the intersection of US Rt. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive during the Build Conditions, the following mitigation measures were implemented at this intersection:
  - Install a northbound right turn overlap phase with a new 5-section doghouse traffic signal head
  - Optimize signal timing and offsets
    - All traffic signal timing and offset changes were developed with consideration of the existing coordinated signal system along US Rte. 17. The proposed traffic signal timings used in the Mitigated Conditions analysis were developed without changing the existing cycle length of the intersection.
- The results of the capacity analysis with these mitigation measures in place indicate the following:
  - Under Mitigated Conditions, the intersection is projected to experience an increase in overall delay of 0.2 seconds during the morning peak hour and 1.9 seconds during the evening peak hour.
  - The mitigation measures are projected to reduce delay for the northbound right turn movement by 309.9 seconds during the morning peak hour and 526.5 seconds during the evening peak hour from Build Conditions.
  - During the morning peak hour, the intersection is projected to operate at an acceptable overall LOS C during No Build and Mitigated Conditions.
  - During the evening peak hour, the intersection is projected to operate at an acceptable overall LOS D during No Build and Mitigated Conditions.
- **Based on the results of the capacity analyses, the proposed development is not expected to adversely impact the surrounding roadway network, provided that the proposed mitigation improvements are implemented.**

## **Introduction**

This report summarizes the findings of the Traffic Impact Analysis performed by Bowman Consulting Group (BCG) for the proposed Royal Farms Convenience Store and Gas Station located in Stafford County, VA. The purpose of this analysis is to determine the potential impact (if any) to the existing traffic operations of the surrounding network caused by the proposed development.

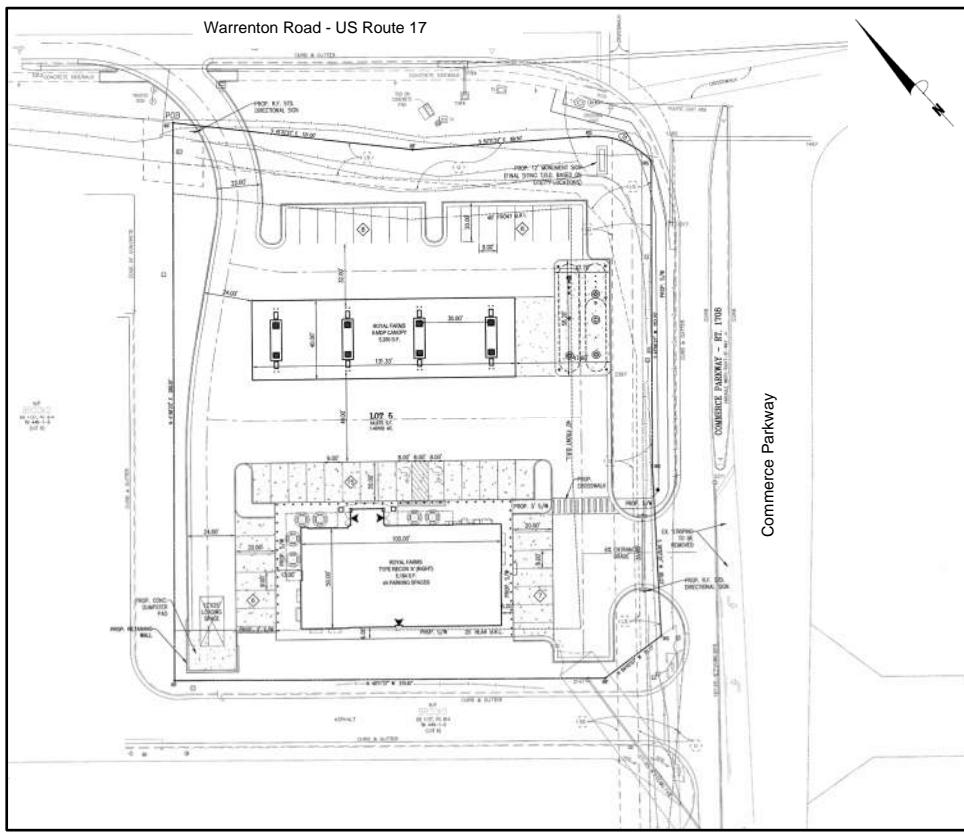
## **Background Information**

The proposed development is to be located at the SW corner of the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive. The proposed development is expected to replace an abandoned equipment rental store on a 1.49 acre parcel. **Figure 1** depicts the site location.



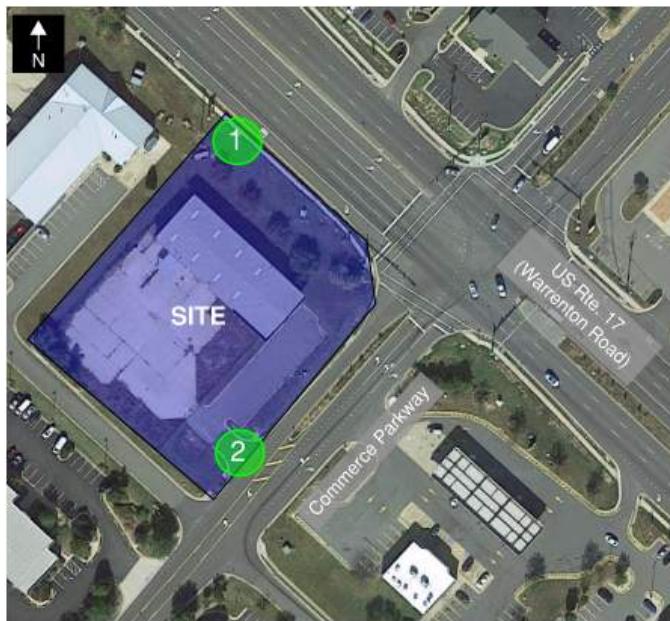
**Figure 1. Site Location**

The applicant is proposing to develop the site with a 5,154 SF Convenience Store and Gas Station with 8 Multi-Pump Dispensers (16 vehicle fueling positions). The most recent Site Plan for the proposed site is depicted in **Figure 2** and **Appendix A**.



## **Figure 2. Site Plan**

Access to the site will be provided via one previously approved driveway and one existing driveway. The approved driveway is a right-in only driveway connecting to US. Rte 17 (Driveway 1) and the existing driveway is a full-access driveway connecting to Commerce Parkway (Driveway 2). **Figure 3** depicts the access points for the proposed site.



**Figure 3. Site Access Points**

## **Scope of Work**

A scoping meeting for the proposed development was held on August 5, 2020 with members of Stafford County and the Virginia Department of Transportation (VDOT). The purpose of this meeting was to discuss and agree upon major components of this study. The signed pre-scope of work form is contained in **Appendix B** of this report.

During the meeting, items such as intersections to be analyzed, arrival/departure trip distribution, traffic growth factor, traffic count data, and site access were discussed. Some of the items discussed and agreed upon by all parties are listed below:

### Study Periods

- Existing Conditions (2020)
- Future Conditions (2022) without the proposed development (No Build)
- Future Conditions (2022) with the proposed development (Build)

### Intersections to be Analyzed

- US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive
- US Rte. 17 (Warrenton Road) and proposed site Right-in Driveway No. 1
- Commerce Parkway and proposed site full-access Driveway No. 2

Due to the coordinated signals on US Rte. 17, the adjacent traffic signals (McWhirt Loop and Falls Run Drive) were included in the Synchro network for accuracy of the traffic progression on the US Rte. 17 corridor. These additional two intersections were not evaluated in the Capacity Analysis. A

Synchro file containing signal timings and roadway geometry for the US Rte. 17 corridor was provided to BCG by VDOT.

#### Turning Movement Counts

Since traffic data is unable to be collected at the study intersections due to the COVID-19 outbreak, VDOT and the County agreed to supply BCG with traffic data from 2017. It was agreed by VDOT that a background growth factor of 1.25% per year will be used in the study area to grow these traffic volumes to Existing and Future Conditions. Documentation supporting this growth rate is provided in **Appendix B**.

## Existing Roadway Network

US Rte. 17 (Warrenton Road) is a six-lane divided roadway with auxiliary lanes, listed as a Principal Arterial on VDOT's 2014 Functional Classification Map. It has an east-west alignment with a posted speed limit of 45 miles per hour within the study area.

Plantation Drive is a four-lane divided roadway with auxiliary lanes, listed as a Major Collector on VDOT's 2014 Functional Classification Map. It has a north-south alignment with a posted speed limit of 35 miles per hour within the study area.

Commerce Parkway is a two-lane undivided roadway with a two-way left turn lane, listed as a Local Road on VDOT's 2014 Functional Classification Map. It has a north-south alignment with a posted speed limit of 35 miles per hour within the study area.

## Existing Intersection Configuration

### **Intersection of US. Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive**

This intersection is currently a four-legged signalized intersection where US Rte. 17 (Warrenton Road) has an east-west alignment and Commerce Parkway/Plantation Drive has a north-south alignment as shown on **Figure 4**.



**Figure 4. Aerial of US Rte. 17 and Commerce Pkwy/Plantation Dr**

The westbound approach consists of one left turn lane (450 feet storage), three through lanes, and one right turn lane. The eastbound approach consists of two left turn lanes (280 feet storage), three through lanes, and one right turn lane. The southbound approach (Plantation Drive) consists of one left turn lane, one shared left/through lane, and one right turn lane (270 feet storage). The northbound approach (Commerce Parkway) consists of one left turn lane (135 feet storage), one shared left/through lane, and one right turn lane (260 feet storage).

## **Data Collection**

Traffic data could not be collected at the study intersections due to the COVID-19 outbreak. The COVID-19 outbreak is ongoing and has greatly affected traffic patterns across the state, eliminating the ability for turning movement counts to accurately reflect existing traffic characteristics.

Therefore, VDOT and the County agreed to supply BCG with traffic counts collected in 2017 at the study intersections. The 2017 Traffic Counts are depicted on **Exhibit 1** in **Appendix C**.

## **Programmed Improvements**

It is BCG's understanding that there are no programmed improvements in the nearby study area that need to be considered in this analysis.

## **Traffic Forecast and Background Traffic**

For the purposes of this analysis, it is anticipated that the proposed development will be constructed and fully operational by the year 2022. The following scenarios were evaluated as part of this study:

- Existing Conditions (2020)
- Future Conditions (2022) without the proposed development (No Build)
- Future Conditions (2022) with the proposed development (Build)

To develop the 2020 existing traffic volumes, the 2017 traffic counts were grown three (3) years using the a 1.25% per year growth rate. The 2020 Existing Traffic Volumes are depicted in **Exhibit 2 in Appendix C.**

This growth rate was then applied to the 2017 Traffic Counts to develop the 2022 No Build Traffic Volumes, which are depicted on **Exhibit 3 in Appendix C.**

## **Proposed Development**

The applicant is proposing to develop the site with a 5,154 SF Convenience Store and Gas Station with 16 vehicle fueling positions. The proposed development is expected to replace an abandoned equipment rental store.

## **Trip Generation and Trip Distribution**

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th edition was used to determine the number of trips generated by the land use Super Convenience Market/Gas Station (Land Use 960). Sites that are classified within this land use category have the following characteristics:

- The gross floor area of the convenience greater than 3,000 gross square feet; and
- The number of vehicle fueling positions is at least 10.

The pass-by rate (76%) for the proposed development was extracted from Tables E.39 and E.40 of The Institute of Transportation Engineers (ITE) *Trip Generation Handbook*, Third Edition Errata.

The proposed development is expected to generate 470 trips (235 in and 235 out) during the morning peak hour and 385 trips (193 in and 192 out) during the evening peak hour. Of these trips, 112 (56 in and 56 out) are primary trips (trips new to the roadway network) during the morning peak hour, and 92 (46 in and 46 out) are primary trips during the evening peak hour. The remainder of trips expected for the proposed development are pass-by trips (trips that are currently on the roadway network and temporarily diverted into the proposed site).

**Table 1** outlines the projected trip generation for the proposed development.

**Table 1. Site Trip Generation**

Trip Generation (Per ITE Trip Generation Manual - 10th Edition)

| Development                          | Land Use | Size       | Units   | Total Trips <sup>(1)</sup> |            |            | Pass-By Trips <sup>(2)</sup> |            |            | Primary Trips |           |            |
|--------------------------------------|----------|------------|---------|----------------------------|------------|------------|------------------------------|------------|------------|---------------|-----------|------------|
|                                      |          |            |         | In                         | Out        | Total      | In                           | Out        | Total      | In            | Out       | Total      |
| <b>Weekday AM Peak Hour</b>          |          |            |         |                            |            |            |                              |            |            |               |           |            |
| Super Convenience Market/Gas Station | 960      | 5,154 / 16 | SF / FP | 235                        | 235        | 470        | 179                          | 179        | 358        | 56            | 56        | 112        |
| <b>Total, AM Peak Hour</b>           |          |            |         | <b>235</b>                 | <b>235</b> | <b>470</b> | <b>179</b>                   | <b>179</b> | <b>358</b> | <b>56</b>     | <b>56</b> | <b>112</b> |
| <b>Weekday PM Peak Hour</b>          |          |            |         |                            |            |            |                              |            |            |               |           |            |
| Super Convenience Market/Gas Station | 960      | 5,154 / 16 | SF / FP | 193                        | 192        | 385        | 147                          | 146        | 293        | 46            | 46        | 92         |
| <b>Total, PM Peak Hour</b>           |          |            |         | <b>193</b>                 | <b>192</b> | <b>385</b> | <b>147</b>                   | <b>146</b> | <b>293</b> | <b>46</b>     | <b>46</b> | <b>92</b>  |

<sup>(1)</sup>Based on the Institute of Transportation Engineers Trip Generation Manual, 10th Edition for Land Use 360

<sup>(2)</sup>Based on the Institute of Transportation Engineers Trip Generation Manual, 3rd Edition Errata for Land Use 360

The expected trip distribution for the proposed site was developed based on traffic characteristics in the surrounding area and was discussed and agreed upon during the scoping meeting with VDOT. The projected primary trip distribution for the proposed development is depicted on **Exhibit 4** in **Appendix C**, and the projected pass-by trip distribution for the proposed development is depicted on **Exhibit 5** in **Appendix C**.

The projected trips for the proposed site were then distributed to the roadway network in accordance with the projected primary and pass-by trip distributions.

The projected primary and pass-by trips for the proposed development are depicted on **Exhibits 6 and 7**, respectively, in **Appendix C**. The total development site-generated trips are depicted on **Exhibit 8** in **Appendix C**.

The projected site trips were then added to the 2022 No Build Traffic Volumes to develop the 2022 Build Traffic Volumes, which are depicted on **Exhibit 9** in **Appendix C**.

## **Capacity Analysis**

The study intersections were analyzed for each scenario following the Highway Capacity Manual (HCM 6<sup>th</sup> edition) methodologies using the computer software package Synchro 10 with SimTraffic. The analysis uses capacity, Level of Service, and control delay as the criteria for the performance of the driveways.

Capacity, as defined by the HCM, is a measure of the maximum number of vehicles in an hour that can travel through an intersection or section of roadway under typical conditions. Level of Service (LOS) is a marker of the driving conditions and perception of drivers while traveling during the given time period. LOS ranges from LOS "A" which represents free flow conditions, to LOS "F" which represents breakdown conditions. **Table 2** shows the LOS for unsignalized intersections as defined by the HCM.

**Table 2. HCM Level of Service Criteria**

| Unsignalized Intersections |                                 | Signalized Intersections |                                 |
|----------------------------|---------------------------------|--------------------------|---------------------------------|
| Level of Service           | Average Control Delay (sec/veh) | Level of Service         | Average Control Delay (sec/veh) |
| A                          | ≤10                             | A                        | ≤10                             |
| B                          | >10-15                          | B                        | >10-20                          |
| C                          | >15-25                          | C                        | >20-35                          |
| D                          | >25-35                          | D                        | >35-55                          |
| E                          | >35-50                          | E                        | >55-80                          |
| F                          | ≥50                             | F                        | ≥80                             |

Control delay is a measure of the total amount of delay experienced by an individual vehicle and includes delay related to deceleration, queue delay, stopped delay, and acceleration. **Table 2** displays the amount of control delay (in seconds per vehicle) that corresponds to the LOS for signalized and unsignalized intersections.

Capacity analyses were completed for the following scenarios for the morning and evening peak hours:

- Existing Conditions (2020)
- Future Conditions (2022) without the proposed development (No Build)
- Future Conditions (2022) with the proposed development (Build)

## **Analysis of Existing Conditions (Year 2020)**

A capacity analysis was conducted for the study intersections previously described in this report. This capacity analysis is based on traffic volumes, lane configurations, and intersection configurations. The capacity analysis results are included in **Appendix D**.

### US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive

Based on the results of the capacity analysis under 2020 Existing Conditions, the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive currently operates at an acceptable overall level of service "C" during both the morning and evening peak hours.

During the morning peak hour, the eastbound and westbound left movements are expected to operate at a LOS E. The northbound and southbound approaches (including all turning

movements) are also expected to operate at a LOS E. All other turning movements and approaches are expected to operate at an acceptable LOS C or better.

During the evening peak hour, the eastbound and westbound left movements are expected to operate at a LOS E. The northbound left, northbound through, southbound left, southbound through, and southbound approach are all also expected to operate at a LOS E. The northbound right and northbound approach are expected to operate at a LOS F. All other turning movements and approaches are expected to operate at an acceptable LOS C or better.

As is outlined above, the northbound and southbound turning movements and approaches at this location appear to experience capacity constraints under existing conditions. A review of the analysis indicates that these constraints are a result of the traffic signal timings at this location, and not the vehicular demand of the northbound and southbound approaches.

US Rte. 17 is a corridor of significance, and therefore the traffic signal timings at this location give priority to the US Rte. 17 mainline. Based on the relatively low queues observed for the northbound and southbound approaches, it appears that the operations of these approaches could be improved significantly through traffic signal retiming at this location.

The queue results from SimTraffic indicate that the available storage for the auxiliary lanes during the morning and evening peak hours is not exceeded for any turning movement. The capacity results are summarized in **Table 3**.

**Table 3. Existing Conditions (2020) Capacity Analysis – US Rte. 17 and Commerce Pkwy**

| INTERSECTION   |    |          | AM Peak     |          |                             | PM Peak     |          |                             |
|--|----|----------|-------------|----------|-----------------------------|-------------|----------|-----------------------------|
|  |    |          | Conditions  |          |                             | Conditions  |          |                             |
|  |    |          | DELAY (S)   | LOS      | 95th Percentile Queue (ft)* | DELAY (S)   | LOS      | 95th Percentile Queue (ft)* |
| <b>Intersection #1:<br/>US Rte. 17 (Warrenton Road) &amp;<br/>Commerce Pkwy/Plantation Dr<br/>(2020 Existing Conditions)</b> | EB | L        | 59.3        | E        | 72                          | 58.3        | E        | 120                         |
|  |    | T        | 22.2        | C        | 221                         | 21.7        | C        | 201                         |
|  |    | R        | 8.0         | A        | 21                          | 8.1         | A        | 20                          |
|  |    | Approach | 23.6        | C        | --                          | 24.4        | C        | --                          |
|  | WB | L        | 61.7        | E        | 152                         | 69.0        | E        | 117                         |
|  |    | T        | 26.3        | C        | 435                         | 28.4        | C        | 414                         |
|  |    | R        | 6.6         | A        | 49                          | 9.4         | A        | 64                          |
|  |    | Approach | 26.6        | C        | --                          | 27.1        | C        | --                          |
|  | NB | L        | 59.2        | E        | 31                          | 65.0        | E        | 45                          |
|  |    | LT       | 59.4        | E        | 73                          | 65.2        | E        | 107                         |
|  |    | R        | 62.9        | E        | 53                          | 181.3       | F        | 104                         |
|  |    | Approach | 61.3        | E        | --                          | 144.4       | F        | --                          |
|  | SB | L        | 61.1        | E        | 167                         | 61.0        | E        | 193                         |
|  |    | LT       | 61.1        | E        | 154                         | 61.0        | E        | 180                         |
|  |    | R        | 62.4        | E        | 82                          | 5.4         | A        | 89                          |
|  |    | Approach | 61.5        | E        | --                          | 56.8        | E        | --                          |
| <b>OVERALL</b>   |    |          | <b>28.6</b> | <b>C</b> | --                          | <b>25.6</b> | <b>C</b> | --                          |

\*Extracted from SimTraffic simulation software

## Capacity Analysis Comparison – No Build vs Build Conditions (Year 2022)

Capacity Analyses were conducted for the No Build and Build conditions (year 2022). The primary purpose for this approach was to compare the results in order to identify areas impacted by the proposed development. The capacity results are included in **Appendices E and F**.

### US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive

Based on the results of the capacity analysis during the morning peak hour, the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive is projected to operate at an acceptable overall level of service "C" under No Build Conditions, degrading to a still acceptable overall level of service "D" during Build Conditions, with an increase in overall delay of 12.9 seconds.

The eastbound left movement is projected to operate at a LOS E during No Build Conditions, improving to a LOS D during Build Conditions. This reduction appears to be due to eastbound pass-by trips utilizing the right-in site driveway on US Rte. 17 and bypassing the eastbound approach at the signal.

The westbound left, northbound left, and northbound through movements are projected to operate at a LOS E during both No Build and Build Conditions, with minimal increases in delay (1.5 seconds maximum). The southbound approach and all turning movements are also projected to operate at a LOS E during both the No Build and Build Conditions.

The northbound right and the northbound approach are projected to degrade from a LOS E during No Build Conditions to a LOS F during Build Conditions.

All other turning movements and approaches are projected to operate at an acceptable LOS C or better during No Build and Build conditions.

The northbound and southbound turning movements and approaches at this location appear to experience capacity constraints during the No Build Conditions. Due to the relatively low traffic volumes for these approaches, these constraints appear to be a result of the traffic signal timings at this intersection, and not the vehicular demand of the northbound and southbound approaches.

These constraints are compounded during the Build Conditions, due to the addition of northbound and southbound traffic at this location associated with the proposed site.

Based on the relatively low queues projected for the northbound and southbound approaches under Build Conditions, it appears that the operations of these approaches could be improved significantly through traffic signal retiming at this location.

The queue results from SimTraffic indicate that the available storage for the auxiliary lanes during the morning peak hour is not exceeded for any turning movement from No Build to Build Conditions. The capacity results are summarized in **Table 4**.

**Table 4. 2022 AM Peak Hour Capacity Analysis – US Rte. 17 and Commerce Pkwy**

| INTERSECTION  |    |          | AM Peak (No Build) |          |                             | AM Peak (Build) |          |                             |
|---|----|----------|--------------------|----------|-----------------------------|-----------------|----------|-----------------------------|
|   |    |          | Conditions         |          |                             | Conditions      |          |                             |
|   |    |          | DELAY (S)          | LOS      | 95th Percentile Queue (ft)* | DELAY (S)       | LOS      | 95th Percentile Queue (ft)* |
| <b>Intersection #1:<br/>US Rte. 17 (Warrenton Road) &amp; Commerce Pkwy/Plantation Dr<br/>(2022 No Build vs. 2022 Build<br/>Conditions)</b> | EB | Movement |                    |          |                             |                 |          |                             |
|   |    | L        | 59.7               | E        | 72                          | 39.9            | D        | 72                          |
|   |    | T        | 22.9               | C        | 217                         | 9.8             | A        | 209                         |
|   |    | R        | 8.1                | A        | 22                          | 2.5             | A        | 21                          |
|   | WB | Approach | 24.3               | C        | --                          | 11.2            | B        | --                          |
|   |    | L        | 61.4               | E        | 183                         | 61.6            | E        | 249                         |
|   |    | T        | 27.0               | C        | 427                         | 26.7            | C        | 424                         |
|   |    | R        | 6.5                | A        | 53                          | 6.5             | A        | 64                          |
|   | NB | Approach | 27.3               | C        | --                          | 27.3            | C        | --                          |
|   |    | L        | 59.2               | E        | 32                          | 60.5            | E        | 109                         |
|   |    | LT       | 59.3               | E        | 75                          | 60.8            | E        | 159                         |
|   |    | R        | 62.8               | E        | 55                          | 359.0           | F        | 156                         |
|   | SB | Approach | 61.2               | E        | --                          | 256.1           | F        | --                          |
|   |    | L        | 61.2               | E        | 179                         | 66.5            | E        | 189                         |
|   |    | LT       | 61.2               | E        | 166                         | 71.7            | E        | 189                         |
|   |    | R        | 62.6               | E        | 76                          | 62.3            | E        | 74                          |
|   |    | Approach | 61.6               | E        | --                          | 67.5            | E        | --                          |
| <b>OVERALL</b>  |    |          | <b>29.2</b>        | <b>C</b> | --                          | <b>42.1</b>     | <b>D</b> | --                          |

\*Extracted from SimTraffic simulation software

Based on the results of the capacity analysis during the evening peak hour, the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive is projected to operate at an acceptable overall level of service "D" during No Build Conditions, degrading to an overall level of service "E" during Build Conditions, with an increase in overall delay of 35.3 seconds.

The eastbound left, westbound left, northbound left, northbound through, and the southbound approach and all turning movements are projected to operate at a LOS E during both the No Build and Build Conditions, with minimal increases in delay (4.1 seconds maximum).

The northbound right and northbound approach are projected to degrade from a LOS E during No Build Conditions to a LOS F during Build Conditions.

All other turning movements and approaches are projected to operate at an acceptable LOS C or better during No Build and Build conditions.

The northbound and southbound turning movements and approaches at this location appear to experience capacity constraints during the No Build Conditions. Due to the relatively low traffic

volumes for these approaches, these constraints appear to be a result of the traffic signal timings at this intersection, and not the vehicular demand of the northbound and southbound approaches.

These constraints are compounded during the Build Conditions, due to the addition of northbound and southbound traffic at this location associated with the proposed site.

Based on the relatively low queues projected for the northbound and southbound approaches under Build Conditions, it appears that the operations of these approaches could be improved significantly through traffic signal retiming at this location.

The queue results from SimTraffic indicate that the available storage for the auxiliary lanes during the evening peak hour is not exceeded for any turning movement from No Build to Build Conditions. The capacity results are summarized in **Table 5**.

**Table 5. 2022 PM Peak Hour Capacity Analysis – US Rte. 17 and Commerce Pkwy**

| INTERSECTION  |          |          | PM Peak (No Build) |          |                             | PM Peak (Build) |          |                             |
|---|----------|----------|--------------------|----------|-----------------------------|-----------------|----------|-----------------------------|
|   |          |          | Conditions         |          |                             | Conditions      |          |                             |
|   |          |          | DELAY (S)          | LOS      | 95th Percentile Queue (ft)* | DELAY (S)       | LOS      | 95th Percentile Queue (ft)* |
| <b>Intersection #1:</b><br>US Rte. 17 (Warrenton Road) &<br>Commerce Pkwy/Plantation Dr<br>(2022 No Build vs. 2022 Build<br>Conditions) | Approach | Movement |                    |          |                             |                 |          |                             |
|   |          | L        | 58.7               | E        | 120                         | 60.6            | E        | 127                         |
|   |          | T        | 22.4               | C        | 195                         | 23.3            | C        | 200                         |
|   |          | R        | 8.3                | A        | 25                          | 9.2             | A        | 23                          |
|   | WB       | Approach | 25.0               | C        | --                          | 26.1            | C        | --                          |
|   |          | L        | 68.9               | E        | 104                         | 73.0            | E        | 134                         |
|   |          | T        | 28.9               | C        | 435                         | 28.7            | C        | 410                         |
|   |          | R        | 9.4                | A        | 66                          | 8.6             | A        | 63                          |
|   | NB       | Approach | 27.5               | C        | --                          | 27.9            | C        | --                          |
|   |          | L        | 65.1               | E        | 43                          | 67.4            | E        | 126                         |
|   |          | LT       | 65.3               | E        | 106                         | 67.2            | E        | 205                         |
|   |          | R        | 191.4              | F        | 101                         | 653.0           | F        | 193                         |
|   | SB       | Approach | 151.2              | F        | --                          | 477.0           | F        | --                          |
|   |          | L        | 60.8               | E        | 198                         | 60.3            | E        | 199                         |
|   |          | LT       | 60.8               | E        | 189                         | 62.9            | E        | 196                         |
|   |          | R        | 64.2               | E        | 98                          | 61.4            | E        | 92                          |
|   |          | Approach | 62.0               | E        | --                          | 61.6            | E        | --                          |
|   |          | OVERALL  | <b>35.6</b>        | <b>D</b> | --                          | <b>70.9</b>     | <b>E</b> | --                          |

\*Extracted from SimTraffic simulation software

As was previously mentioned in the above analysis, there are capacity constraints on the northbound approach to the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive as a result of the proposed development. This approach will require mitigation.

US Rte. 17 (Warrenton Road) and Site Driveway No. 1

Based on the results of the capacity analysis during the morning peak hour, the eastbound approach is projected to operate at an acceptable LOS A during Build Conditions. While this approach is projected to experience no delay, vehicles are expected to slow down to turn right into the site driveway, resulting in a queue of 8 feet.

The capacity results are summarized in **Table 6**.

**Table 6. 2022 AM Peak Hour Capacity Analysis – US Rte. 17 and Driveway No. 1**

| INTERSECTION   |          |          | AM Peak (Build) |     |                                   |
|--|----------|----------|-----------------|-----|-----------------------------------|
|  |          |          | Conditions      |     |                                   |
| Intersection #3:<br>US Rte. 17 & Driveway No. 1<br>(2022 No Build Conditions vs. 2022<br>Build Conditions) | Approach | Movement | DELAY (S)       | LOS | 95th<br>Percentile<br>Queue (ft)* |
|  | EB       | Approach | 0.0             | A   | 8                                 |

\*Extracted from SimTraffic simulation software

Based on the results of the capacity analysis during the evening peak hour, the eastbound approach is projected to operate at an acceptable LOS A during Build Conditions. While this approach is projected to experience no delay, vehicles are expected to slow down to turn right into the site driveway, resulting in a queue of 7 feet.

The capacity results are summarized in **Table 7**.

**Table 7. 2022 PM Peak Hour Capacity Analysis – US Rte. 17 and Driveway No. 1**

| INTERSECTION   |          |          | PM Peak (Build) |     |                                   |
|--|----------|----------|-----------------|-----|-----------------------------------|
|  |          |          | Conditions      |     |                                   |
| Intersection #3:<br>US Rte. 17 & Driveway No. 1<br>(2022 No Build Conditions vs. 2022<br>Build Conditions) | Approach | Movement | DELAY (S)       | LOS | 95th<br>Percentile<br>Queue (ft)* |
|  | EB       | Approach | 0.0             | A   | 7                                 |

\*Extracted from SimTraffic simulation software

Commerce Parkway and Site Driveway No. 2

Based on the results of the capacity analysis during the morning peak hour, the eastbound (exiting) approach is projected to operate at a LOS B, and the northbound approach is projected to operate at a LOS A during the Build Conditions.

The queue results from SimTraffic do not appear to exceed the available storage for the auxiliary lanes during the Build Conditions. The capacity results are summarized in **Table 8**.

**Table 8. 2022 AM Peak Hour Capacity Analysis – Commerce Pkwy and Driveway No. 2**

| INTERSECTION  |          |          | AM Peak (Build) |     |                                   |
|---|----------|----------|-----------------|-----|-----------------------------------|
|   |          |          | Conditions      |     |                                   |
| Intersection #2:<br>Commerce Pkwy & Driveway No. 2<br>(2022 No Build Conditions vs. 2022<br>Build Conditions) | Approach | Movement | DELAY (S)       | LOS | 95th<br>Percentile<br>Queue (ft)* |
|   |          |          | 14.3            | B   | 133                               |
|   | NB       | Approach | 0.6             | A   | 37                                |

\*Extracted from SimTraffic simulation software

Based on the results of the capacity analysis during the evening peak hour, the eastbound (exiting) approach is projected to operate at a LOS B, and the northbound approach is projected to operate at a LOS A during the Build Conditions.

The queue results from SimTraffic do not appear to exceed the available storage for the auxiliary lanes during the Build Conditions. The capacity results are summarized in **Table 9**.

**Table 9. 2022 PM Peak Hour Capacity Analysis – Commerce Parkway and Driveway No. 2**

| INTERSECTION  |          |          | PM Peak (Build) |     |                                   |
|---|----------|----------|-----------------|-----|-----------------------------------|
|   |          |          | Conditions      |     |                                   |
| Intersection #2:<br>Commerce Pkwy & Driveway No. 2<br>(2022 No Build Conditions vs. 2022<br>Build Conditions) | Approach | Movement | DELAY (S)       | LOS | 95th<br>Percentile<br>Queue (ft)* |
|   |          |          | 14.1            | B   | 115                               |
|   | NB       | Approach | 0.3             | A   | 32                                |

\*Extracted from SimTraffic simulation software

## Capacity Analysis Comparison – No Build vs Mitigated Conditions (Year 2022)

As previously mentioned, capacity constraints were projected at the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive as a result of the proposed development. To reduce/negate these impacts, the following mitigation measures are proposed at this intersection:

- Install a northbound right turn overlap phase with a new 5-section doghouse traffic signal head
- Optimize signal timing and offsets
  - All traffic signal timing and offset changes were developed with consideration of the existing coordinated signal system along US Rte. 17. The proposed traffic signal timings used in the Mitigation Conditions analysis were developed without changing the existing cycle length of the intersection.

To measure the impacts of the proposed mitigation will have on the network, capacity analyses were conducted for the Mitigated Conditions (year 2022). The capacity analysis results were then compared with the No Build Conditions in order to identify if the proposed mitigation should effectively reduce/negate the capacity constraints projected as a result of the proposed development. The Mitigated Conditions capacity results are included in **Appendix G**.

*US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive*

Based on the capacity analysis during the morning peak hour, the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive is projected to operate at an acceptable overall level of service "C" during both No Build and Mitigated Conditions with an increase in overall delay of 0.2 seconds.

The westbound left, northbound left, northbound through, and the southbound approach and all turning movements are projected to operate at a LOS E during both the No Build and Mitigated Conditions, with minimal increases in delay, and several decreases in delay.

The northbound right and northbound approach are projected to improve from a LOS E during the No Build Conditions to a LOS D during the Build Conditions, with decreases in delay of 13.7 seconds and 9.6 seconds, respectively.

All other turning movements and approaches are projected to operate at an acceptable LOS C or better during the Mitigated Conditions.

It was previously mentioned that the operations of the northbound and southbound approaches could be improved significantly through traffic signal retiming at this location and that US Rte. 17 is a corridor of significance.

Therefore, the mitigated traffic signal timings during the morning peak hour were developed to allow the northbound and southbound approaches to operate at similar or better conditions to the No Build scenario, while still maintaining the traffic signal timings priority for the US Rte. 17 approaches.

The queue results from SimTraffic do not appear to exceed the available storage for the auxiliary lanes during the Mitigated Conditions. The capacity results are summarized in **Table 10**.

**Table 10. 2022 AM Peak Hour Capacity Analysis – US Rte. 17 and Commerce Pkwy**

| INTERSECTION  |    |          | AM Peak (No Build) |      |                             | AM Peak (Mitigated) |      |                             |
|---|----|----------|--------------------|------|-----------------------------|---------------------|------|-----------------------------|
|   |    |          | Conditions         |      |                             | Conditions          |      |                             |
|   |    |          | DELAY (S)          | LOS  | 95th Percentile Queue (ft)* | DELAY (S)           | LOS  | 95th Percentile Queue (ft)* |
| <b>Intersection #1:<br/>US Rte. 17 (Warrenton Road) &amp; Commerce Pkwy/Plantation Dr<br/>(2022 No Build vs. 2022 Build Conditions)</b> | EB | Approach | Movement           |      |                             |                     |      |                             |
|   |    |          | L                  | 59.7 | E                           | 72                  | 39.9 | D                           |
|   |    |          | T                  | 22.9 | C                           | 217                 | 11.7 | B                           |
|   |    |          | R                  | 8.1  | A                           | 22                  | 2.5  | A                           |
|   | WB | Approach |                    | 24.3 | C                           | --                  | 12.9 | B                           |
|   |    |          | L                  | 61.4 | E                           | 183                 | 61.6 | E                           |
|   |    |          | T                  | 27.0 | C                           | 427                 | 31.5 | C                           |
|   |    |          | R                  | 6.5  | A                           | 53                  | 7.8  | A                           |
|   | NB | Approach |                    | 27.3 | C                           | --                  | 31.6 | C                           |
|   |    |          | L                  | 59.2 | E                           | 32                  | 56.2 | E                           |
|   |    |          | LT                 | 59.3 | E                           | 75                  | 56.5 | E                           |
|   |    |          | R                  | 62.8 | E                           | 55                  | 49.1 | D                           |
|   | SB | Approach |                    | 61.2 | E                           | --                  | 51.6 | D                           |
|   |    |          | L                  | 61.2 | E                           | 179                 | 66.5 | E                           |
|   |    |          | LT                 | 61.2 | E                           | 166                 | 71.7 | E                           |
|   |    |          | R                  | 62.6 | E                           | 76                  | 62.3 | E                           |
|   |    | Approach |                    | 61.6 | E                           | --                  | 67.5 | E                           |
|   |    |          | OVERALL            | 29.2 | C                           | --                  | 29.6 | C                           |

\*Extracted from SimTraffic simulation software

Based on the capacity analysis during the evening peak hour, the intersection of US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive is projected to operate at an acceptable overall level of service "D" during both No Build and Mitigated Conditions with an increase in overall delay of 1.9 seconds.

The eastbound left, westbound left, northbound left, northbound through, and the southbound approach and all turning movements are projected to operate at a LOS E during both the No Build and Mitigated Conditions, with minimal increases in delay.

The northbound right and northbound approach are projected to operate at a LOS F during both the No Build and Mitigated Conditions. However, the delay associated with these movements is projected to decrease by 64.9 seconds and 42.9 seconds, respectively under Mitigated Conditions.

All other turning movements and approaches are projected to operate at an acceptable LOS C or better during the Mitigated Conditions.

It was previously mentioned that the operations of the northbound and southbound approaches could be improved significantly through traffic signal retiming at this location and that US Rte. 17 is a corridor of significance.

Therefore, the mitigated traffic signal timings during the morning peak hour were developed to allow the northbound and southbound approaches to operate at similar or better conditions to the No Build scenario, while still maintaining the traffic signal timings priority for the US Rte. 17 approaches.

The queue results from SimTraffic do not appear to exceed the available storage for the auxiliary lanes during the Mitigated Conditions. The capacity results are summarized in **Table 11**.

**Table 11. 2022 PM Peak Hour Capacity Analysis – US Rte. 17 and Commerce Pkwy**

| INTERSECTION  | Approach | Movement | PM Peak (No Build) |          |                             | PM Peak (Mitigated) |          |                             |
|---|----------|----------|--------------------|----------|-----------------------------|---------------------|----------|-----------------------------|
|   |          |          | Conditions         |          |                             | Conditions          |          |                             |
|   |          |          | DELAY (S)          | LOS      | 95th Percentile Queue (ft)* | DELAY (S)           | LOS      | 95th Percentile Queue (ft)* |
| <b>Intersection #1:<br/>US Rte. 17 (Warrenton Road) &amp; Commerce Pkwy/Plantation Dr<br/>(2022 No Build vs. 2022 Build Conditions)</b> | EB       | L        | 58.7               | E        | 120                         | 65.4                | E        | 139                         |
|   |          | T        | 22.4               | C        | 195                         | 24.9                | C        | 214                         |
|   |          | R        | 8.3                | A        | 25                          | 9.7                 | A        | 23                          |
|   |          | Approach | 25.0               | C        | --                          | 28.1                | C        | --                          |
|   | WB       | L        | 68.9               | E        | 104                         | 67.7                | E        | 132                         |
|   |          | T        | 28.9               | C        | 435                         | 25.5                | C        | 329                         |
|   |          | R        | 9.4                | A        | 66                          | 7.4                 | A        | 61                          |
|   |          | Approach | 27.5               | C        | --                          | 24.9                | C        | --                          |
|   | NB       | L        | 65.1               | E        | 43                          | 66.1                | E        | 94                          |
|   |          | LT       | 65.3               | E        | 106                         | 65.9                | E        | 176                         |
|   |          | R        | 191.4              | F        | 101                         | 126.5               | F        | 179                         |
|   |          | Approach | 151.2              | F        | --                          | 108.3               | F        | --                          |
|   | SB       | L        | 60.8               | E        | 198                         | 61.3                | E        | 186                         |
|   |          | LT       | 60.8               | E        | 189                         | 65.4                | E        | 182                         |
|   |          | R        | 64.2               | E        | 98                          | 63.5                | E        | 92                          |
|   |          | Approach | 62.0               | E        | --                          | 63.6                | E        | --                          |
| <b>OVERALL</b>  |          |          | <b>35.6</b>        | <b>D</b> | --                          | <b>37.5</b>         | <b>D</b> | --                          |

\*Extracted from SimTraffic simulation software

## **Summary**

The proposed development is expected to generate 112 net primary trips during the morning peak hour and 92 net primary trips during the evening peak hour. The proposed development (ITE Land Use 960) is expected to have a pass-by percentage of 76% for the morning and evening peak hours.

## **Capacity Analysis Results**

### **2022 Build Scenario**

- To evaluate the traffic operations for year 2022, intersection capacity analyses were completed. With the addition of anticipated trips from the proposed development, the results indicate the following:
  - US Rte. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive
    - Under Build Conditions, the intersection is projected to experience an increase in overall delay of 12.9 seconds during the morning peak hour and 35.3 seconds during the evening peak hour.
    - During the morning peak hour, the intersection is projected to operate at an acceptable overall LOS C during No Build Conditions, decreasing to an acceptable overall LOS D during Build Conditions.
    - During the evening peak hour, the intersection is projected to operate at an acceptable overall LOS D during No Build Conditions, decreasing to an overall LOS E during Build Conditions.
  - Commerce Parkway and Driveway 2
    - During the morning and evening peak hours, the results of the analysis indicate that there is no significant increase in overall delay with the addition of the proposed development's site traffic.
    - The intersection is projected to operate at an acceptable overall LOS A during both morning and evening peak hours during Build Conditions.
  - US Rte. 17 and Driveway 1
    - During the morning and evening peak hours, the results of the analysis indicate that there is no significant increase in overall delay with the addition of the proposed development's site traffic.
    - The intersection is projected to operate at an acceptable overall LOS A during both morning and evening peak hours during Build Conditions.

## **2022 Mitigated Scenario**

- Due to the capacity constraints projected at the intersection of US Rt. 17 (Warrenton Road) and Commerce Parkway/Plantation Drive during the Build Conditions, the following *mitigation/recommendation measures* were implemented at this intersection:
  - Install a northbound right turn overlap phase with a new 5-section doghouse traffic signal head
  - Optimize signal timing and offsets
    - All traffic signal timing and offset changes were developed with consideration of the existing coordinated signal system along US Rte. 17. The proposed traffic signal timings used in the Mitigated Conditions analysis were developed without changing the existing cycle length of the intersection.
- The results of the capacity analysis with these mitigation measures in place indicate the following:
  - Under Mitigated Conditions, the intersection is projected to experience an increase in overall delay of 0.2 seconds during the morning peak hour and 1.9 seconds during the evening peak hour.
  - The mitigation measures are projected to reduce delay for the northbound right turn movement by 309.9 seconds during the morning peak hour and 526.5 seconds during the evening peak hour from Build Conditions.
  - During the morning peak hour, the intersection is projected to operate at an acceptable overall LOS C during No Build and Mitigated Conditions.
  - During the evening peak hour, the intersection is projected to operate at an acceptable overall LOS D during No Build and Mitigated Conditions.

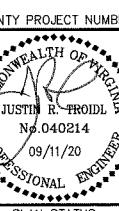
## **Conclusion**

- **Based on the results of the capacity analyses, the proposed development is not expected to adversely impact the surrounding roadway network, provided that the proposed mitigation improvements are implemented.**



## **Appendix A**

### **Conceptual Plan**



JUSTIN R. TROIDL  
No. 040214  
09/11/20

PROFESSIONAL ENGINEER

V.

PLAN STATUS

09/11/20 ISSUED TO CLIENT

DATE DESCRIPTION

JRT JRT JRT

DESIGN DRAWN CHKD

SCALE H: 1"=20'

V: 1 inch = 20 ft

JOB No. 100284-01-001

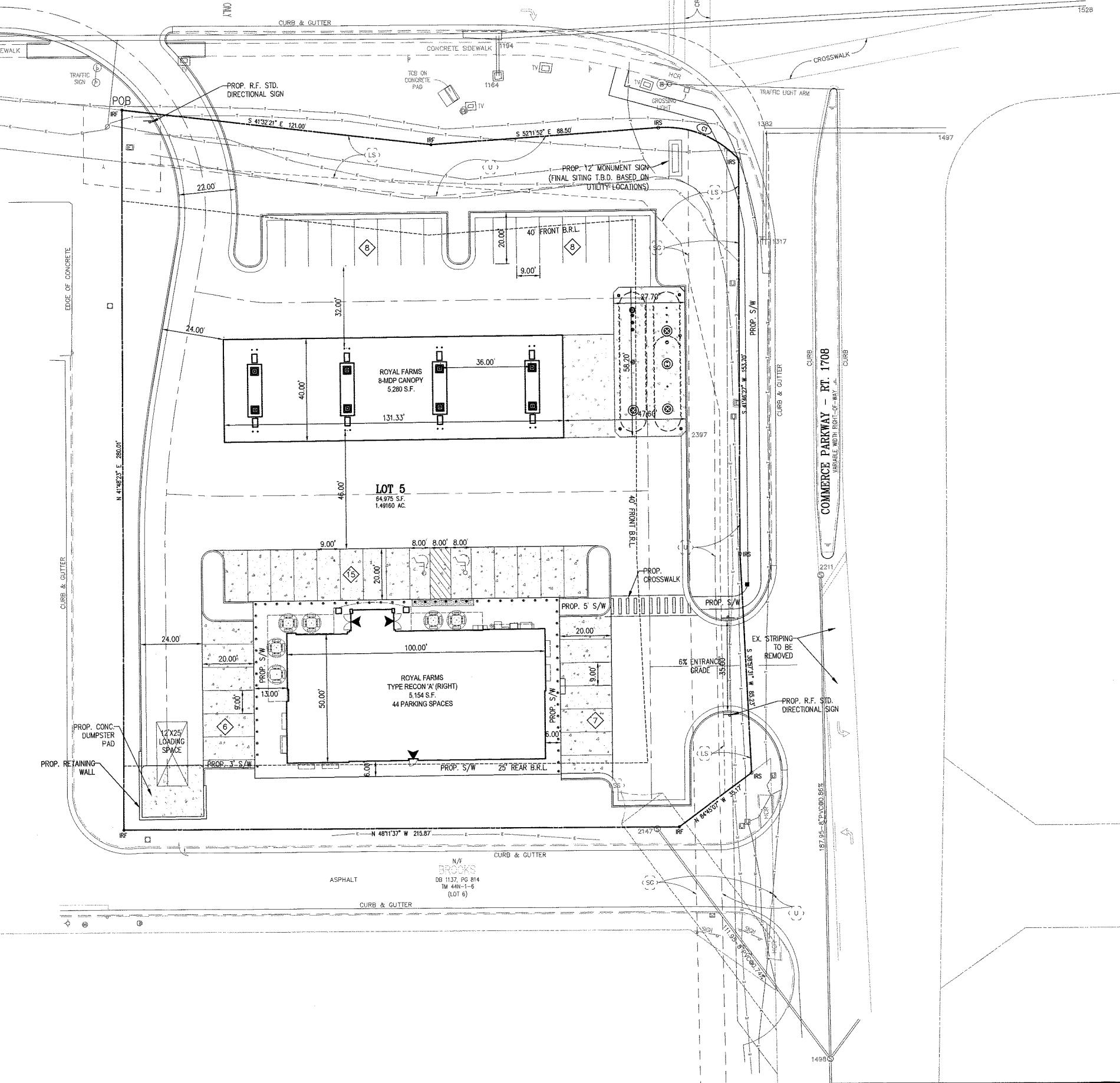
DATE : SEPTEMBER 2020

FILE No. 100284-D-ZP-002

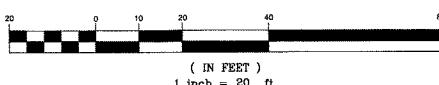
SHEET 5 OF 7

### WARRENTON ROAD - U.S. ROUTE 17

VARIABLE WIDTH RIGHT-OF-WAY



### GRAPHIC SCALE





## **Appendix B**

### **Scope of Work Coordination**



## PRE-SCOPE OF WORK MEETING FORM

### Information on the Project Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

#### Contact Information

|   |  |
|---|--|
| Consultant Name:<br>Tele:<br>E-mail:      | Bowman Consulting Group / Carlos G. Garcia, PE<br>804-616-3240<br>cgarcia@bowmanconsulting.com     |
| Developer/Owner Name:<br>Tele:<br>E-mail: | Sumner Partners LLC / Steven Klebanoff, President<br>301-657-4485<br>sklebanoff@sumnerpartners.com |

#### Project Information

|   |  |  |  |  |
|---|--|--|--|--|
| Project Name:   | Royal Farms Convenience Store with Gas Station   |  | Locality/County:   | Stafford County                        |
| Project Location:<br>(Attach regional and site specific location map)   | US Rte. 17 (Warrenton Road) & Commerce Parkway/Plantation Road Stafford County, VA (See Figure 1)  |  |  |  |
| Submission Type   | Comp Plan <input type="checkbox"/>   | Rezoning <input checked="" type="checkbox"/>   | Site Plan <input type="checkbox"/>                           | Subd Plat <input type="checkbox"/>     |
| Project Description:<br>(Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary) | Proposed development is located at the SW corner of the intersection of US Rte. 17 (Warrenton Road) & Commerce Parkway on tax parcel 44N-1-5. The parcel is currently zoned B-2; developer is applying for a Conditional Use Permit and Proffer Amendment. It is expected to consist of a 5,154 SF convenience store with 8 MPD (16 fueling stations). |  |  |  |
| Proposed Use(s):<br>(Check all that apply; attach additional pages as necessary)  | Residential <input type="checkbox"/>   | Commercial <input checked="" type="checkbox"/> | Mixed Use <input type="checkbox"/>                           | Other <input type="checkbox"/>         |
| See Table 1 for Trip Generation calculations and Table 2 for comparison.  | <b>Residential Uses(s)</b><br>Number of Units: _____<br>ITE LU Code(s): _____  |  | SF _____<br><br><b>Other Use(s)</b><br>ITE LU Code(s): _____ |  |
|   | <b>Commercial Use(s)</b><br>ITE LU Code(s): 960<br>_____   |  | Independent Variable(s): _____<br>_____                      |  |
|   | Square Ft or Other Variable: _____<br>_____  |  |  |  |
| Total Peak Hour Trip Projection:  | Less than 100 <input type="checkbox"/>   | 100 – 499 <input checked="" type="checkbox"/>  | 500 – 999 <input type="checkbox"/>                           | 1,000 or more <input type="checkbox"/> |

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

| <b>Traffic Impact Analysis Assumptions</b>   |  |   |   |
|--|--|---|---|
| Study Period   | Existing Year: 2020  | Build-out Year: 2022                            | Design Year: N/A  |
| Study Area Boundaries<br>(Attach map)  | North: US Rte. 17 (Warrenton Road)   |   | South: Property Line/Trade Street   |
|  | East: Commerce Parkway   |   | West: Property line/Right-in driveway   |
| External Factors That Could Affect Project<br>(Planned road improvements, other nearby developments)   |  |   |   |
| Consistency With Comprehensive Plan<br>(Land use, transportation plan)                                 | Yes  |   |   |
| Available Traffic Data<br>(Historical, forecasts)  | Traffic Data from Virginia Roads (ADTs) and Turning Movement Counts provided by VDOT in 2017 along the US 17 corridor.   |   |   |
| Trip Distribution<br>(Attach sketch)<br><small>See Figure 2 for add'l information</small>              | Road Name: US Rte. 17 (N) 75/48%   | Road Name: US Rte. 17 (S) 10/30%                |   |
|  | Road Name: Plantation Dr 20/10%  | Road Name: Commerce Pkwy 2/5%                   |   |
| Annual Vehicle Trip Growth Rate:   | 1.25%  | Peak Period for Study<br>(check all that apply) | <input checked="" type="checkbox"/> AM <input checked="" type="checkbox"/> PM <input type="checkbox"/> SAT            |
|  |  | Peak Hour of the Generator                      |   |
| Study Intersections and/or Road Segments<br>(Attach additional sheets as necessary)                    | 1. US Rte. 17 and proposed site Right-in Driveway  |   | 6. See Figure 1   |
|  | 2. US Rte. 17 and Commerce Pkwy/Plantation Dr  |   | 7.  |
|  | 3. Commerce Pkwy and existing Full-Access Driveway   |   | 8.  |
|  | 4.   |   | 9.  |
|  | 5.   |   | 10.   |
| Trip Adjustment Factors  | Internal allowance: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Reduction: _____ % trips  |   | Pass-by allowance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br>Reduction: 76 _____ % trips |
| Software Methodology   | <input checked="" type="checkbox"/> Synchro <input type="checkbox"/> HCS (v.2000/+) <input type="checkbox"/> aaSIDRA <input type="checkbox"/> CORSIM <input checked="" type="checkbox"/> Other <small>SimTraffic</small> |   |   |
| Traffic Signal Proposed or Affected<br>(Analysis software to be used, progression speed, cycle length) | Potential Traffic Signal timing changes at the intersection of US Rte. 17 and Commerce Pkwy/Plantation Dr  |   |   |

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

|  |   |
|--|---|
| Improvement(s) Assumed or to be Considered | Potential Traffic Signal retiming.  |
| Background Traffic Studies Considered      | TBD   |
| Plan Submission                            | <input type="checkbox"/> Master Development Plan (MDP) <input checked="" type="checkbox"/> Generalized Development Plan (GDP)<br><input type="checkbox"/> Preliminary/Sketch Plan <input type="checkbox"/> Other Plan type (Final Site, Subd. Plan)   |
| Additional Issues to be Addressed          | <input checked="" type="checkbox"/> Queuing analysis <input checked="" type="checkbox"/> Actuation/Coordination <input type="checkbox"/> Weaving analysis<br><input type="checkbox"/> Merge analysis <input type="checkbox"/> Bike/Ped Accommodations <input checked="" type="checkbox"/> Intersection(s)<br><input type="checkbox"/> TDM Measures <input type="checkbox"/> Other _____ |

NOTES on ASSUMPTIONS: \_\_\_\_\_

SIGNED:  DATE: 08/10/2020

Applicant or Consultant

PRINT NAME: Carlos G. Garcia, PE

Applicant or Consultant

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

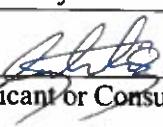
**SCOPE OF WORK MEETING CONCLUSIONS****ADDITIONS TO THE VDOT REQUIRED ELEMENTS, CHANGES TO THE METHODOLOGY OR STANDARD ASSUMPTIONS, AND SIGNATURE PAGE**

Any additions to the VDOT Required Elements or changes to the Methodology or Standard Assumptions due to special circumstances that are approved by VDOT:

A discussion was held between representatives from the Virginia Department of Transportation (VDOT), Stafford County, Sumner Partners LLC, and Bowman Consulting Group on August 5, 2020. The following changes were made to the original scope and agreed to by all parties:

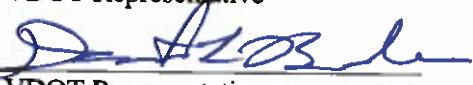
- Primary Trip Distribution: 40% to/from Plantation Drive, 38% to/from North on US Route 17, 20% to/from South on US Route 17, 2% to/from Commerce Pkwy.
- Include adjacent signalized intersections on US Rte. 17 in the Synchro analysis. These intersections do not need to have capacity analyses reported in the final study.
- The Department agreed to the background growth rate of 1.25% as long as the previous justification for this growth rate was supplied. The correspondence documenting this 1.25% growth rate is attached to this scope for reference.
- There are no additional developments that need to be included in the background traffic
- The access to the site on Commerce Pkwy will be evaluated using AutoTurn software. The SB right turn movement accessing the site will be evaluated to verify for vehicular clearance and encroachment avoidance (turning movement templates will be added to the Site Plan package). The parking spaces immediately adjacent to the driveway access on Commerce Parkway will be evaluated to avoid potential conflicts with vehicles entering the site. Relocation of parking spaces may be required.

The applicant will contact VDOT and the locality prior to the preparation of the traffic impact analysis study in the event there are any substantial changes in the existing conditions that will affect the scope of the study.

AGREED:  DATE: 08/10/2020  
Applicant or Consultant

PRINT NAME: Carlos G. Garcia, PE  
Applicant or Consultant

SIGNED: DAVID L. BEALE DATE: 8/13/2020  
VDOT Representative

PRINT NAME:   
VDOT Representative

SIGNED: \_\_\_\_\_ DATE: \_\_\_\_\_  
Local Government Representative

PRINT NAME: \_\_\_\_\_  
Local Government Representative



**Bowman**  
CONSULTING

**Site Location and  
Study Intersections**  
Proposed Royal Farms  
Stafford County, Virginia

**Figure 1**

Job #



Note:

Red percentages indicate primary trip distribution

Blue percentages indicate pass-by trip distribution

**Table 1**

Trip Generation (Per ITE Trip Generation Manual - 10th Edition)

| Development                          | Land Use | Size       | Units   | Total Trips <sup>(1)</sup> |            |            | Pass-By Trips <sup>(2)</sup> |            |            | Primary Trips |           |            |
|--------------------------------------|----------|------------|---------|----------------------------|------------|------------|------------------------------|------------|------------|---------------|-----------|------------|
|                                      |          |            |         | In                         | Out        | Total      | In                           | Out        | Total      | In            | Out       | Total      |
| <b>Weekday AM Peak Hour</b>          |          |            |         |                            |            |            |                              |            |            |               |           |            |
| Super Convenience Market/Gas Station | 960      | 5,154 / 16 | SF / FP | 235                        | 235        | 470        | 179                          | 179        | 358        | 56            | 56        | 112        |
| <b>Total, AM Peak Hour</b>           |          |            |         | <b>235</b>                 | <b>235</b> | <b>470</b> | <b>179</b>                   | <b>179</b> | <b>358</b> | <b>56</b>     | <b>56</b> | <b>112</b> |
| <b>Weekday PM Peak Hour</b>          |          |            |         |                            |            |            |                              |            |            |               |           |            |
| Super Convenience Market/Gas Station | 960      | 5,154 / 16 | SF / FP | 193                        | 192        | 385        | 147                          | 146        | 293        | 46            | 46        | 92         |
| <b>Total, PM Peak Hour</b>           |          |            |         | <b>193</b>                 | <b>192</b> | <b>385</b> | <b>147</b>                   | <b>146</b> | <b>293</b> | <b>46</b>     | <b>46</b> | <b>92</b>  |

(1) Based on the Institute of Transportation Engineers Trip Generation Manual, 10th Edition for Land Use 960

(2) Based on the Institute of Transportation Engineers Trip Generation Manual, 3rd Edition for Land Use 960

**Table 2**

Trip Generation (Per ITE Trip Generation Manual - 10th Edition)

| Development                                   | Land Use | Size       | Units   | Total Trips <sup>(1)</sup> | Pass-By Trips | Primary Trips |
|---|----------|------------|---------|----------------------------|---------------|---------------|
| <b>Weekday AM Peak Hour</b>                   |          |            |         |                            |               |               |
| Existing Equipment Rental "Variety Store"     | 814      | 9,600      | SF      | 31                         | 7             | 24            |
| Existing Equipment Rental "Shopping Center"   | 820      | 9,600      | SF      | 157                        | 38            | 119           |
| Proposed Super Convenience Market/Gas Station | 960      | 5,154 / 16 | SF / FP | 470                        | 358           | 112           |
| <b>Weekday PM Peak Hour</b>                   |          |            |         |                            |               |               |
| Existing Equipment Rental "Variety Store"     | 814      | 9,600      | SF      | 66                         | 22            | 44            |
| Existing Equipment Rental "Shopping Center"   | 820      | 9,600      | SF      | 96                         | 33            | 63            |
| Proposed Super Convenience Market/Gas Station | 960      | 5,154 / 16 | SF / FP | 385                        | 293           | 92            |

(1) Based on the Institute of Transportation Engineers Trip Generation Manual, 10th Edition

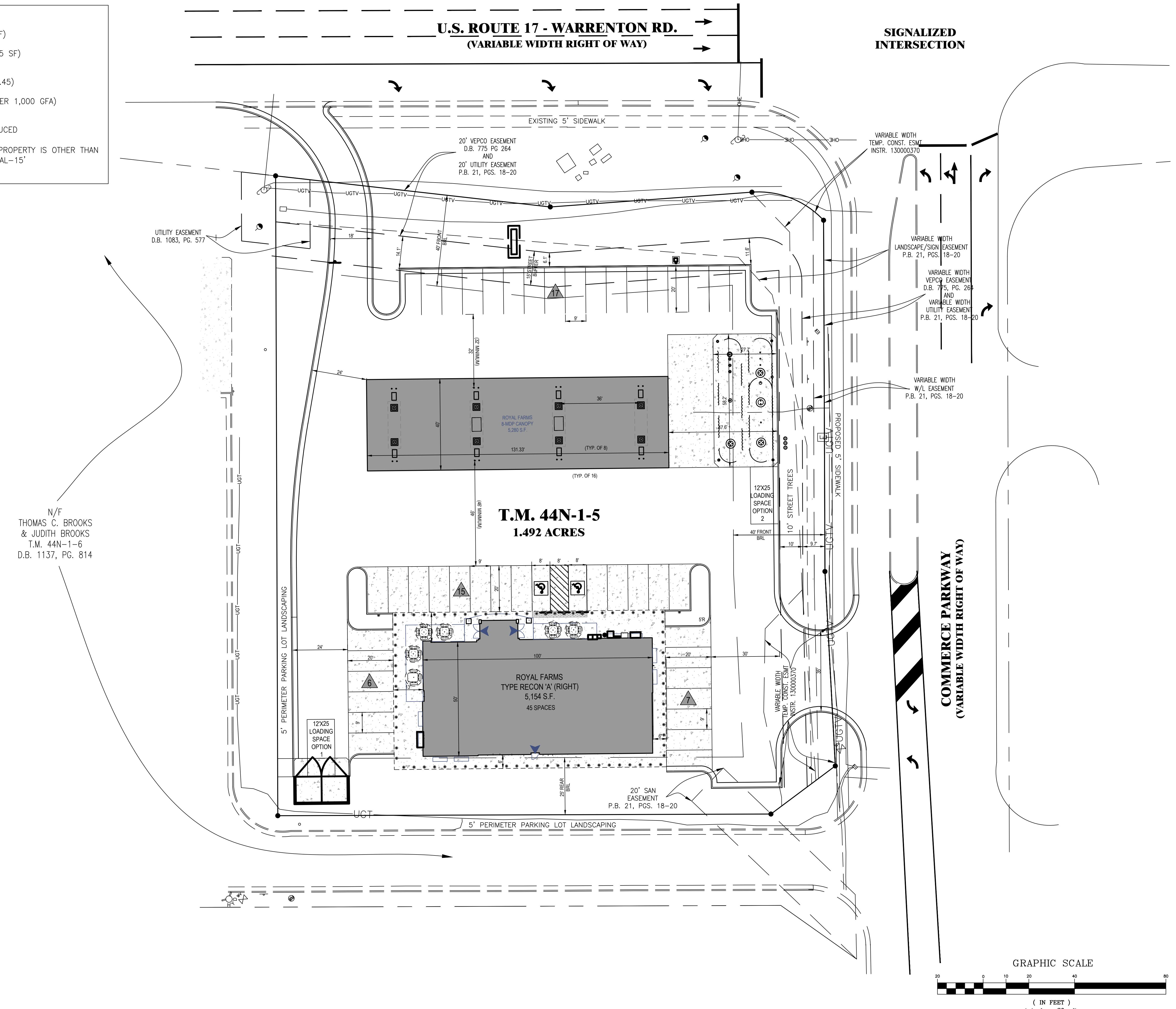
### SITE STATISTICS

PARCEL AREA: 1.4917 AC. (64,978.45 SF)  
 FLOOR AREA RATIO: MAX = 0.70  
 PROVIDED = .079 (5,154 SF/64,978.45 SF)  
 OPEN SPACE RATIO: .25  
 REQUIRED = .2725 (17,709.16/64,978.45)  
 PROVIDED = PARKING: 31 SPACES (6 SPACES PER 1,000 GFA)  
 REQUIRED = PROVIDED = SETBACKS: 45 SPACES  
 FRONT: \*40' \*MAY BE REDUCED  
 REAR: 25'  
 SIDE: \*\*0' \*\*WHERE ADJ. PROPERTY IS OTHER THAN COMMERCIAL OR INDUSTRIAL-15'  
 BUILDING HEIGHT: MAX = 65'

### U.S. ROUTE 17 - WARRENTON RD.

(VARIABLE WIDTH RIGHT OF WAY)

### SIGNALIZED INTERSECTION



## **Michael Young**

---

**From:** Steven Klebanoff <sklebanoff@sumnerpartners.com>  
**Sent:** Thursday, August 6, 2020 11:35 AM  
**To:** Carlos Garcia  
**Cc:** Michael Young; Hedrich, Peter (VDOT); Mike J. Zuraf; Niemann, Margaret  
**Subject:** Commerce Parkway

Carlos – See below the email chain for the reference to the 1.25% growth rate to use in the Rt. 17 corridor that I recalled on our Zoom call. I misspoke when I said that I thought the figure came from Peter. I remember him being on the email chain, but the figure actually came from Stephen Haynes to David and Peter and then forwarded to us. This appears to be the figure to use.

If you have any more questions, please let me know.

Regards, Steve

Steven Klebanoff  
President  
Sumner Partners LLC  
7910 Woodmont Avenue  
Suite 1080  
Bethesda, MD 20814  
301-657-4485 ext. 2  
301-657-5933 FAX  
301-651-8375 Mobile

---

**From:** Steven Klebanoff  
**Sent:** Tuesday, November 26, 2019 9:09 PM  
**To:** Beale, David <david.beale@vdot.virginia.gov>; Brendan Klebanoff <bklebanoff@sumnerpartners.com>  
**Subject:** RE: question

David – Thanks, this is helpful. Can you forward the counts that Peter referenced from 2017? What was that number? What does VDOT think the current ADT is there now?

Regards, Steve

Steven Klebanoff  
President  
Sumner Partners LLC  
7910 Woodmont Avenue  
Suite 1080  
Bethesda, MD 20814  
301-657-4485 ext. 2  
301-657-5933 FAX  
301-651-8375 Mobile

**From:** Beale, David <[david.beale@vdot.virginia.gov](mailto:david.beale@vdot.virginia.gov)>  
**Sent:** Tuesday, November 26, 2019 2:54 PM

**To:** Steven Klebanoff <[sklebanoff@sumnerpartners.com](mailto:sklebanoff@sumnerpartners.com)>; Brendan Klebanoff <[bklebanoff@sumnerpartners.com](mailto:bklebanoff@sumnerpartners.com)>  
**Subject:** Fwd: question

See the string below. Hope that helps...

David L. Beale, P.E.  
Asst. Resident Engineer - Land Use  
86 Deacon Rd  
Fredericksburg, VA 22405  
(540) 654-1973 Office  
(540) 907-1939 Cell

----- Forwarded message -----

From: Haynes, Stephen <[stephen.haynes@vdot.virginia.gov](mailto:stephen.haynes@vdot.virginia.gov)>  
Date: Tue, Nov 26, 2019 at 2:51 PM  
Subject: Re: question  
To: Beale, David <[david.beale@vdot.virginia.gov](mailto:david.beale@vdot.virginia.gov)>  
Cc: Richard Spurlock <[richard.spurlock@vdot.virginia.gov](mailto:richard.spurlock@vdot.virginia.gov)>, Hedrich, Peter <[peter.hedrich@vdot.virginia.gov](mailto:peter.hedrich@vdot.virginia.gov)>

Good afternoon,

I would estimate the AGR to be around 1.25% and the future volume to be approx. 60,000 (2045) on that section of Rte 17.

## Stephen Haynes

District Planning Manager

VDOT - Fredericksburg District

(540) 899-4709

[stephen.haynes@vdot.virginia.gov](mailto:stephen.haynes@vdot.virginia.gov)

On Mon, Nov 25, 2019 at 10:13 AM Hedrich, Peter <[peter.hedrich@vdot.virginia.gov](mailto:peter.hedrich@vdot.virginia.gov)> wrote:

I would think their best bet would be to use the current ADT and apply a growth rate that Stephen may have to offer up.

I have attached our most recent count at the intersection of 17/Commerce from February 2017. This is a 12 hour count.

Peter

Peter Hedrich, PE, PTOE  
Fredericksburg District Traffic Engineer  
Virginia Department of Transportation  
Desk Phone: 540-899-4540 Cell Phone: 207-939-0806  
Office Hours 7:00 AM - 3:30 PM

On Mon, Nov 25, 2019 at 10:07 AM Beale, David <[david.beale@vdot.virginia.gov](mailto:david.beale@vdot.virginia.gov)> wrote:

Did we have a traffic study for the widening project on Rt. 17? Do we have anything more than historical counts?

David L. Beale, P.E.  
Asst. Resident Engineer - Land Use  
86 Deacon Rd  
Fredericksburg, VA 22405  
(540) 654-1973 Office  
(540) 907-1939 Cell

----- Forwarded message -----

From: Steven Klebanoff <[sklebanoff@sumnerpartners.com](mailto:sklebanoff@sumnerpartners.com)>

Date: Sat, Nov 23, 2019 at 1:13 PM

Subject: question

To: Beale, David <[david.beale@vdot.virginia.gov](mailto:david.beale@vdot.virginia.gov)>

David –

Have a question for you. I am trying to see if VDOT or Stafford County have projected the traffic increase on Warrenton Road from I-95 to the Wal Mart over the next 20 or so years. I figured someone would have that information, especially as background for the widening work that VDOT did there.

We have a tenant we are talking to about our site at Commerce Parkway and they asked us if we had that information or could get it for them. Do you have a study somewhere or other source that could provide that information? It appears that there are over 40,000 cars a day now in front of our site and they want to know what the projected increase would be over their 20 year lease term or so.

Let me know if you have that info or if you could point me to someone that I could contact that might be able to help.

Thanks. Steve

Steven Klebanoff

President

Sumner Partners LLC

7910 Woodmont Avenue

Suite 1080

Bethesda, MD 20814

301-657-4485 ext. 2

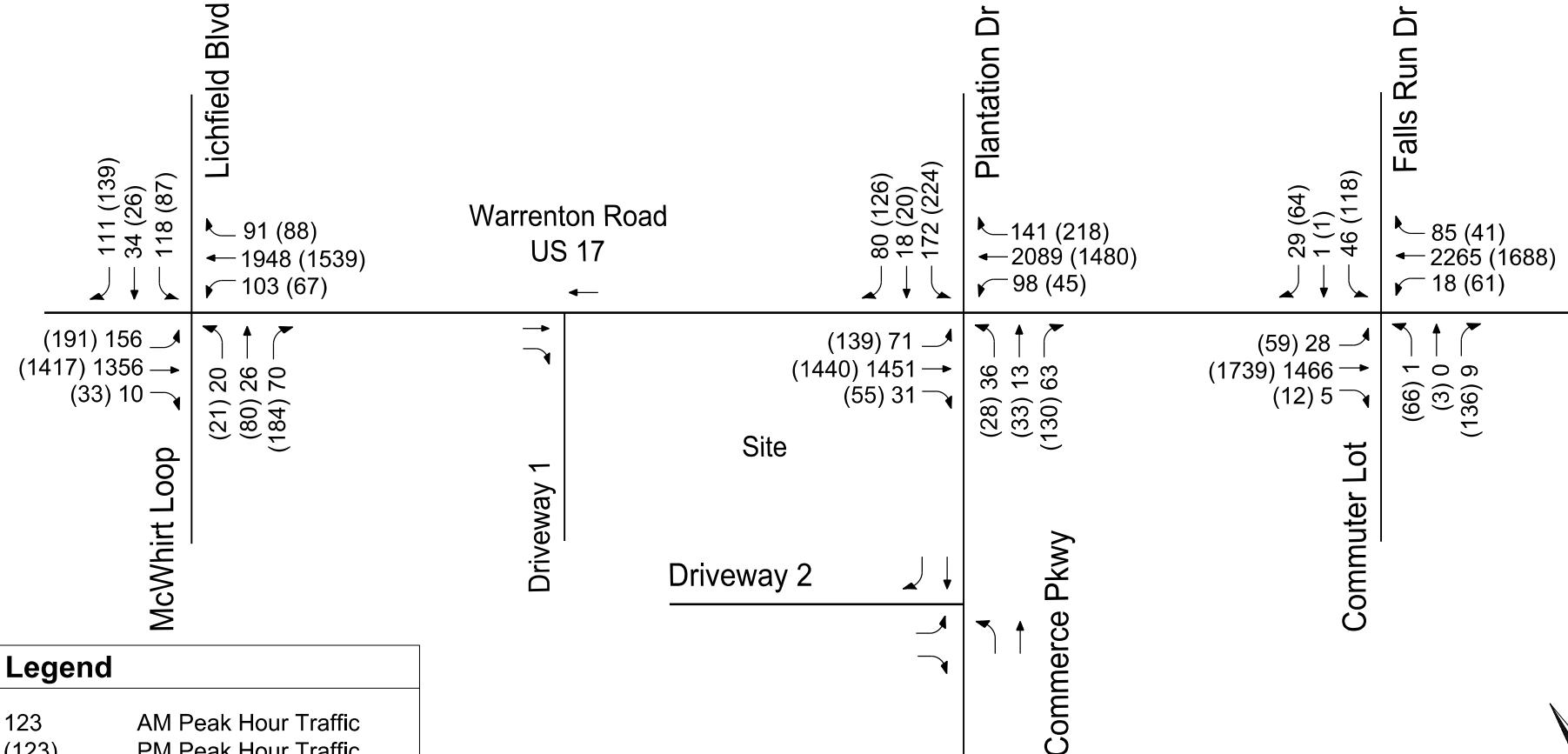
301-657-5933 FAX

301-651-8375 Mobile



## **Appendix C**

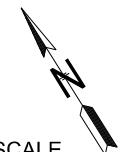
### **Traffic Volume and Traffic Distribution Exhibits**



#### Legend

|       |                      |
|-------|----------------------|
| 123   | AM Peak Hour Traffic |
| (123) | PM Peak Hour Traffic |
| 55%   | AM Volume Percentage |
| (55%) | PM Volume Percentage |

DRAWING NOT TO SCALE

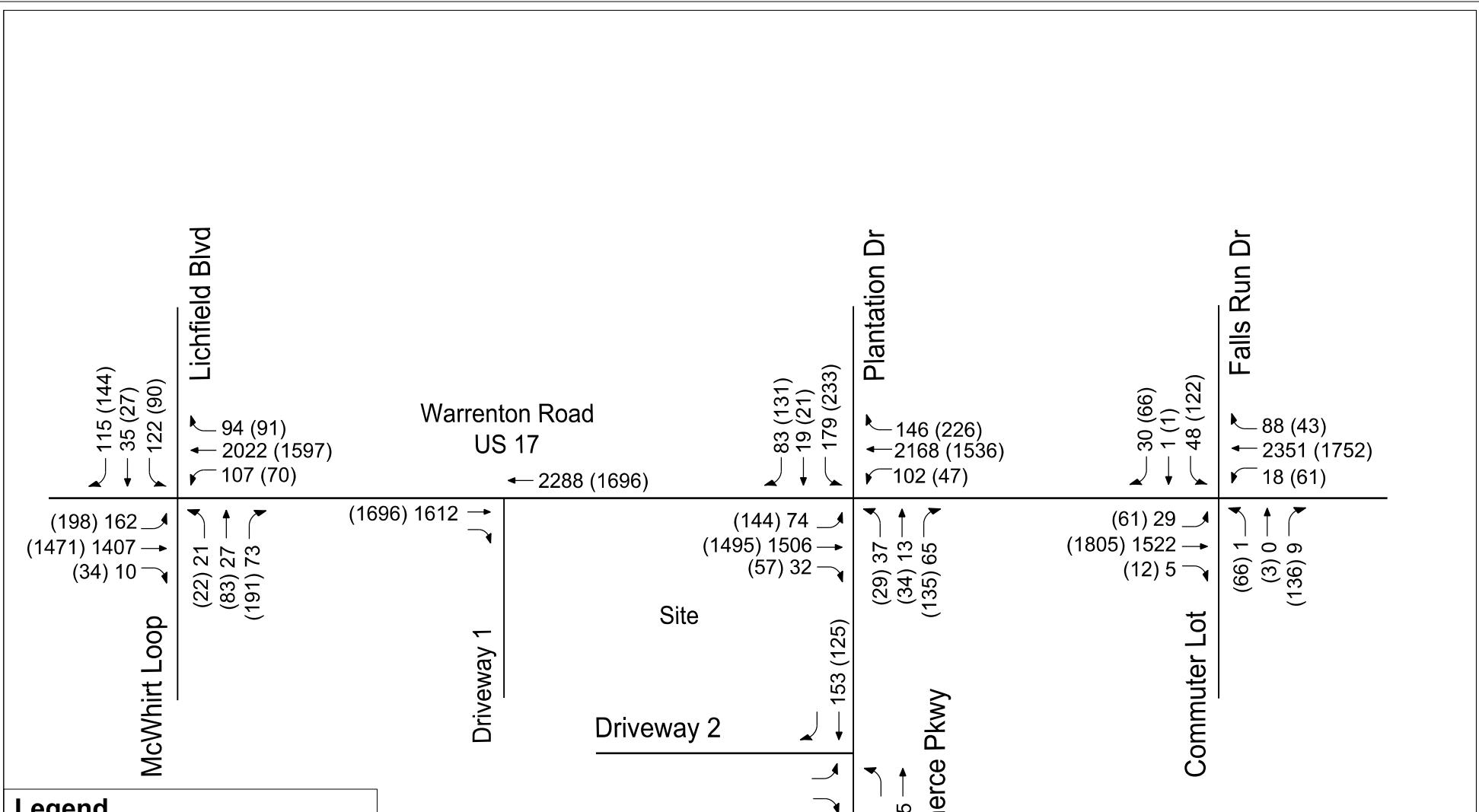


**Bowman**  
CONSULTING

**2017 Traffic Counts**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 1**

Job # 100284-01-002



#### Legend

|              |                      |
|--------------|----------------------|
| 123<br>(123) | AM Peak Hour Traffic |
|              | PM Peak Hour Traffic |
| 55%<br>(55%) | AM Volume Percentage |
|              | PM Volume Percentage |

DRAWING NOT TO SCALE

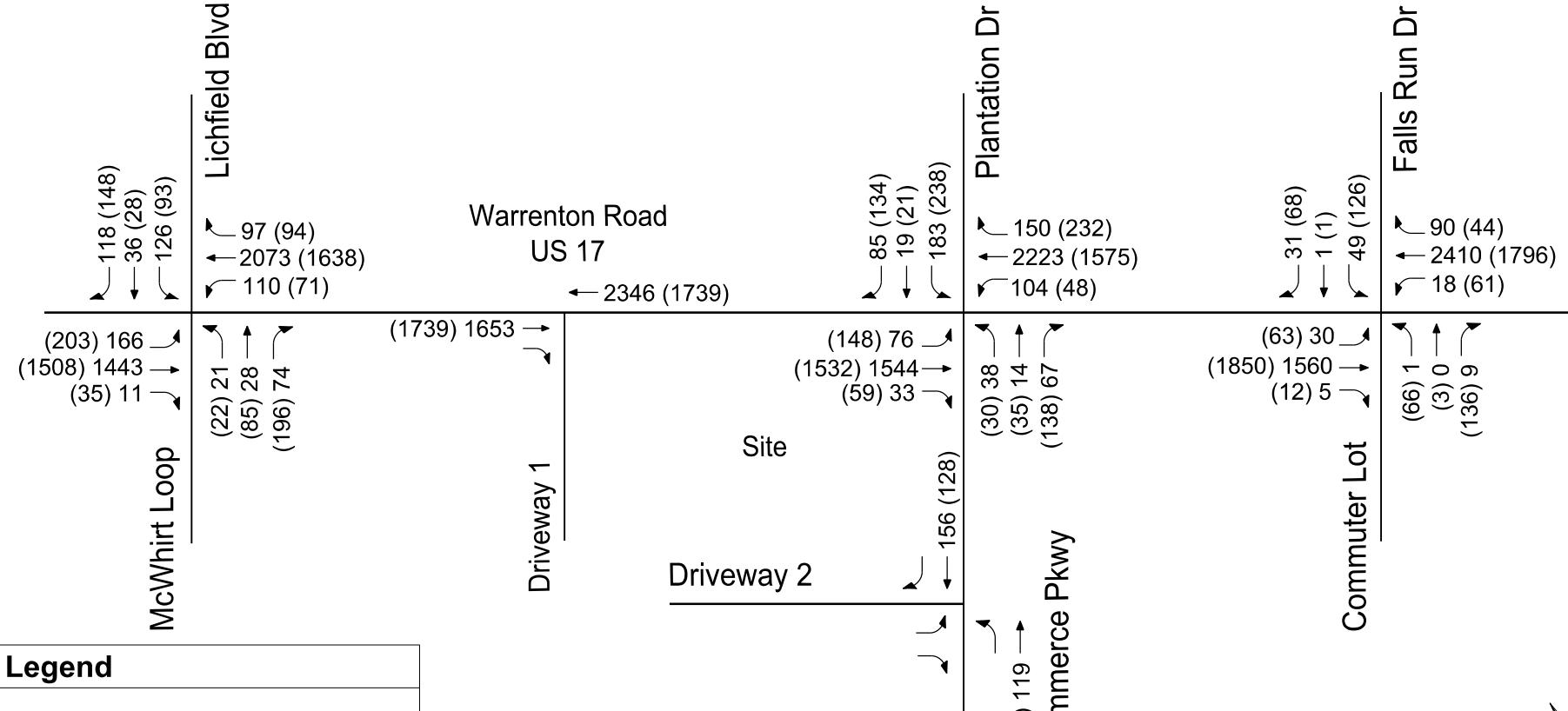


**Bowman**  
CONSULTING

**2020 Existing Traffic Volumes**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 2**

Job # 100284-01-002



#### Legend

|              |  |
|--------------|--|
| 123<br>(123) | AM Peak Hour Traffic<br>PM Peak Hour Traffic |
| 55%<br>(55%) | AM Volume Percentage<br>PM Volume Percentage |

DRAWING NOT TO SCALE

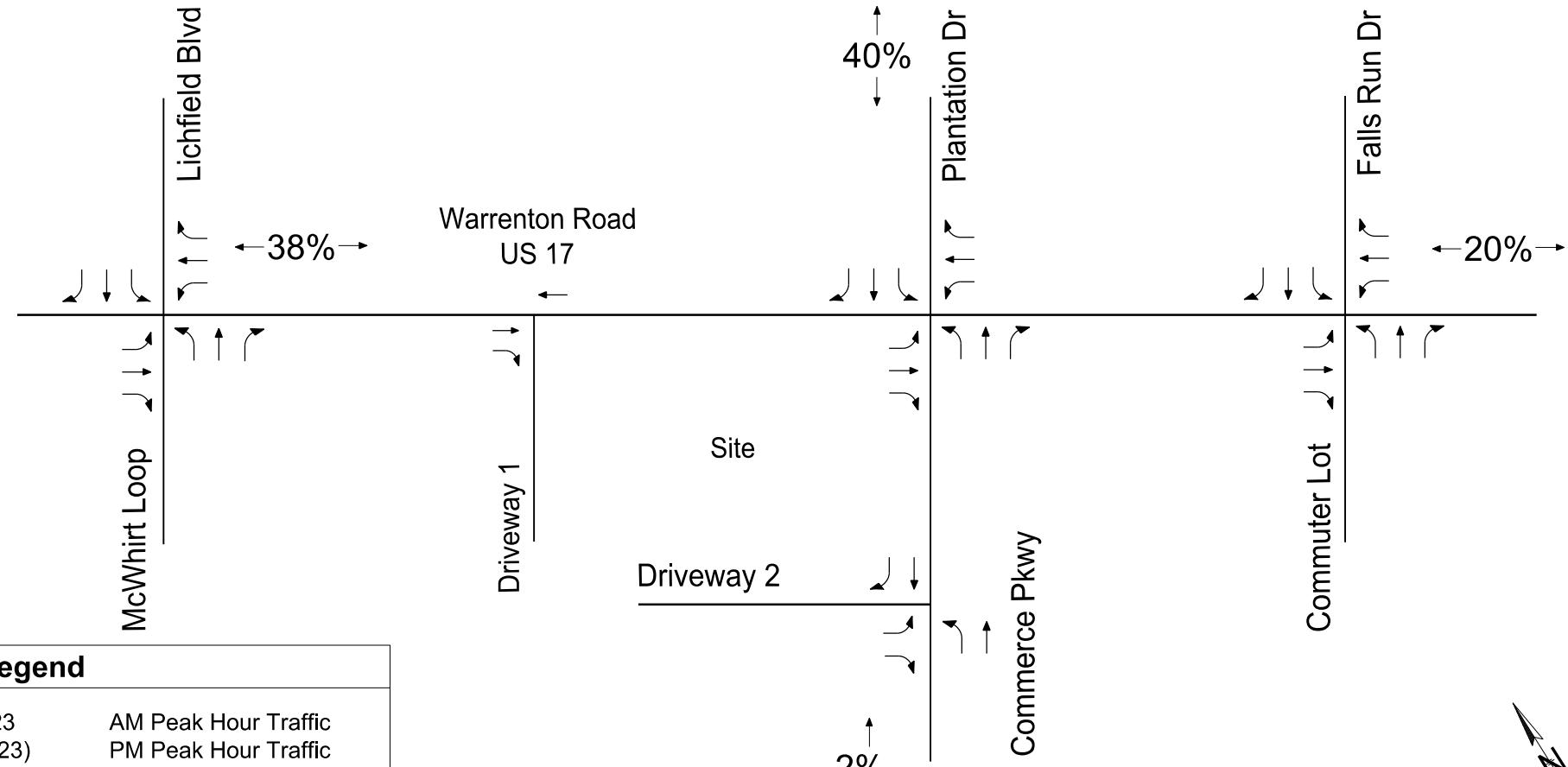


**Bowman**  
CONSULTING

**2022 No Build Traffic Volumes**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 3**

Job # 100284-01-002



**Bowman**  
CONSULTING

**Proposed Royal Farms**  
**Primary Trip Distribution**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 4**

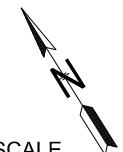
Job # 100284-01-002



#### Legend

|              |  |
|--------------|--|
| 123<br>(123) | AM Peak Hour Traffic<br>PM Peak Hour Traffic |
| 55%<br>(55%) | AM Volume Percentage<br>PM Volume Percentage |

DRAWING NOT TO SCALE

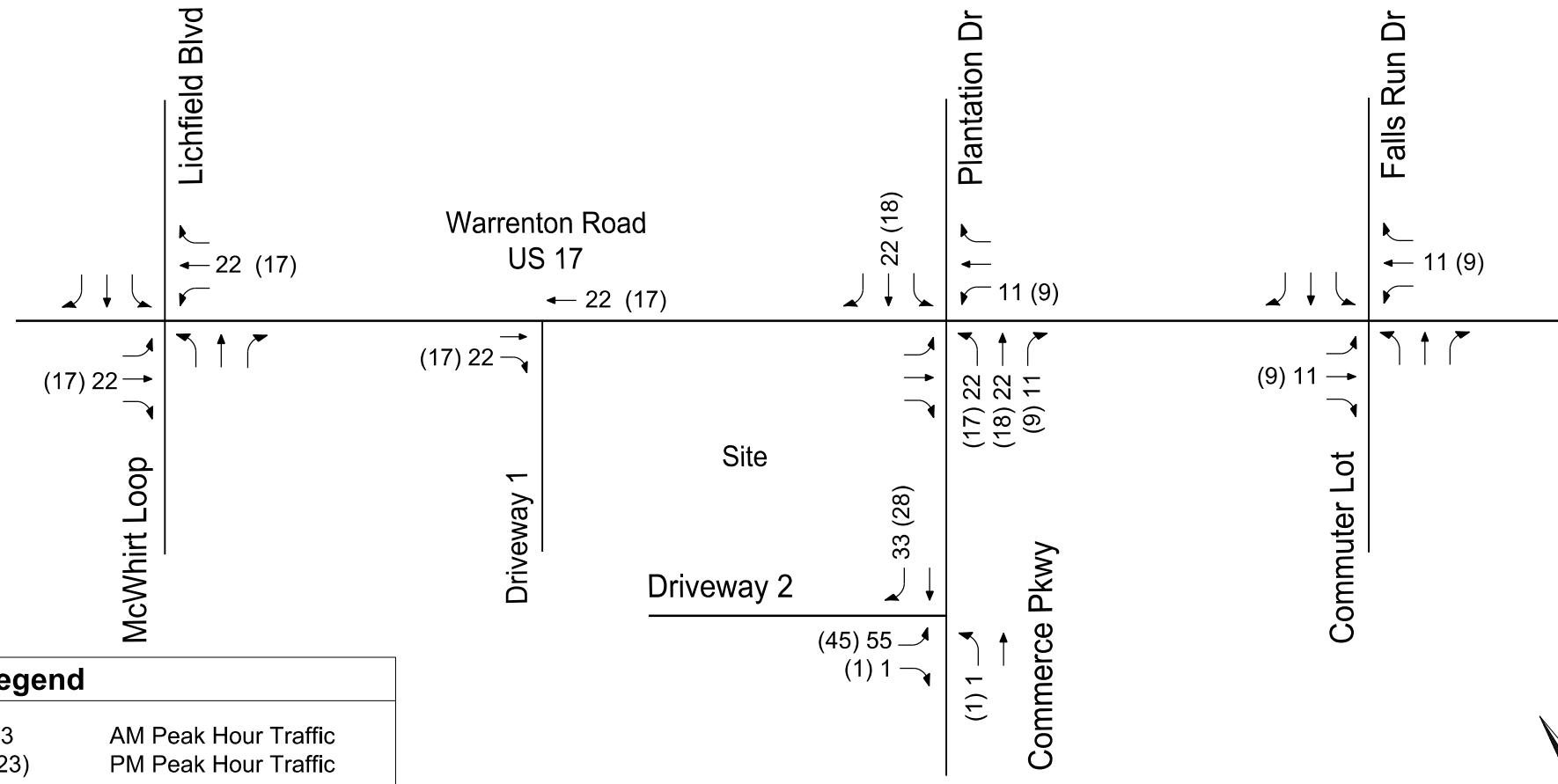


**Bowman**  
CONSULTING

**Proposed Royal Farms  
Pass By Trip Distribution**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 5**

Job # 100284-01-002



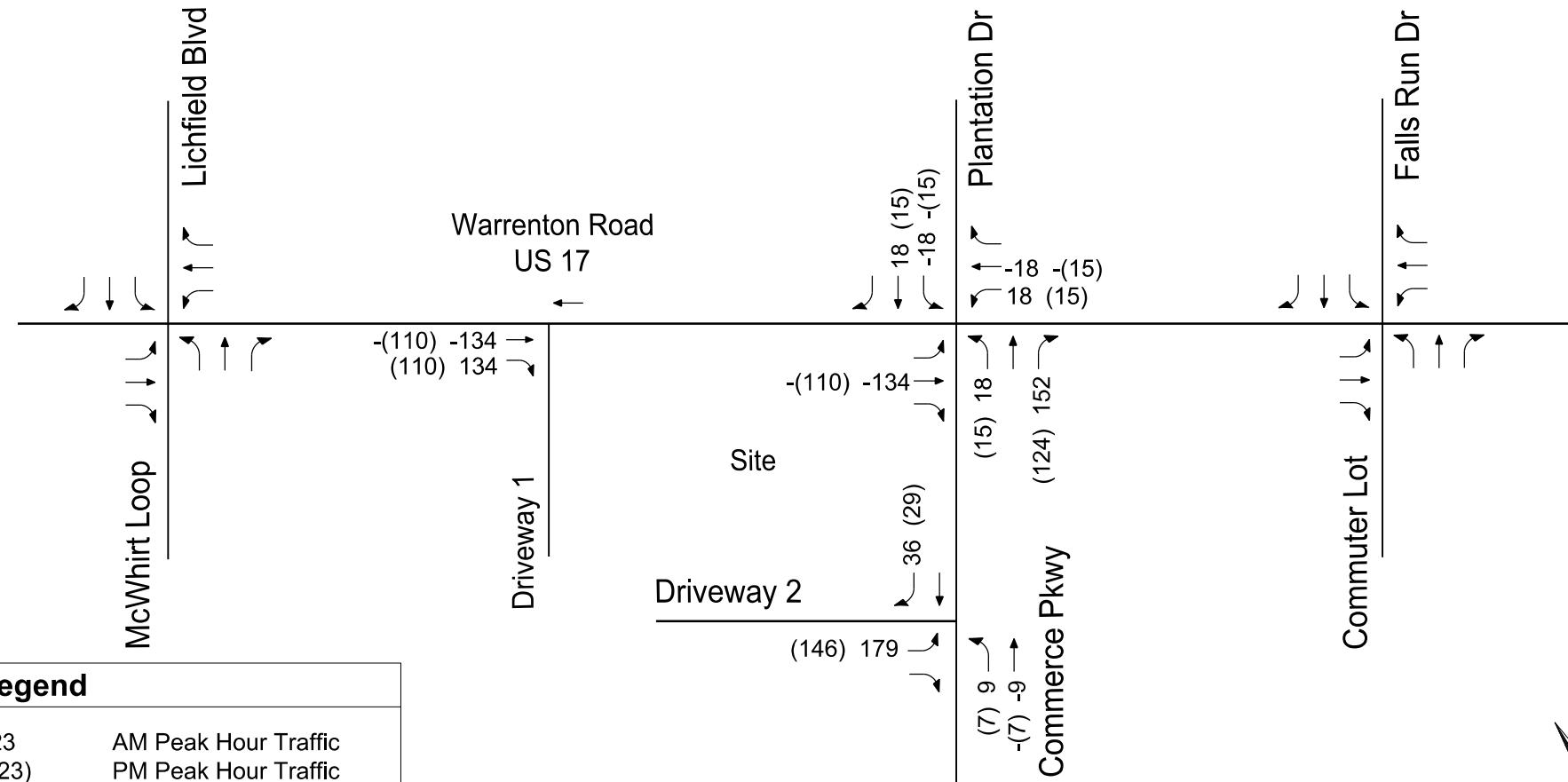
DRAWING NOT TO SCALE

**Bowman**  
CONSULTING

**Proposed Royal Farms**  
**Projected Peak Hour Primary Trips**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 6**

Job # 100284-01-002



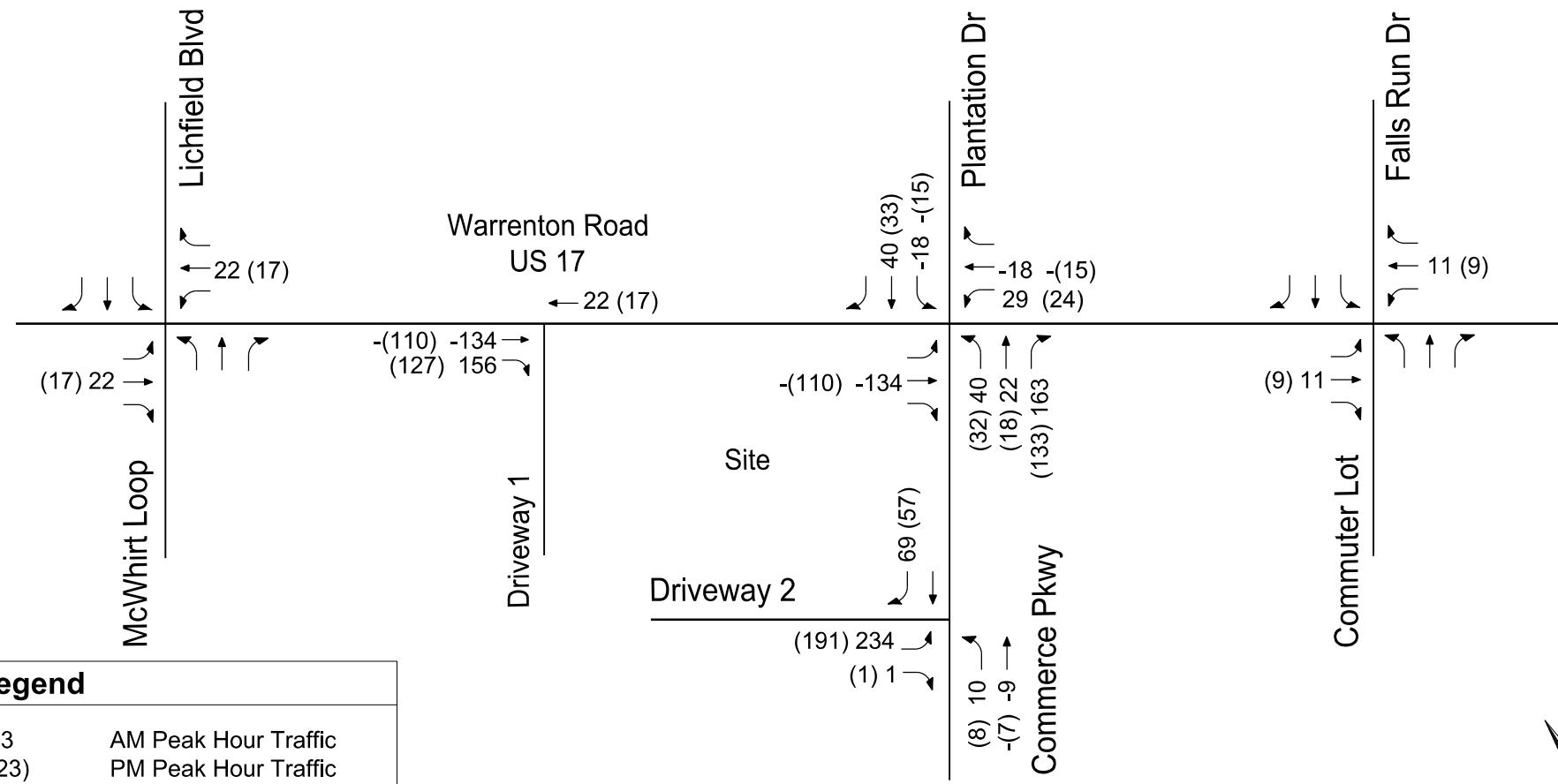
DRAWING NOT TO SCALE

**Bowman**  
CONSULTING

**Proposed Royal Farms**  
**Projected Peak Hour Pass By Trips**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 7**

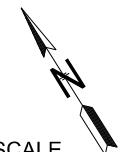
Job # 100284-01-002



#### Legend

|       |                      |
|-------|----------------------|
| 123   | AM Peak Hour Traffic |
| (123) | PM Peak Hour Traffic |
| 55%   | AM Volume Percentage |
| (55%) | PM Volume Percentage |

DRAWING NOT TO SCALE

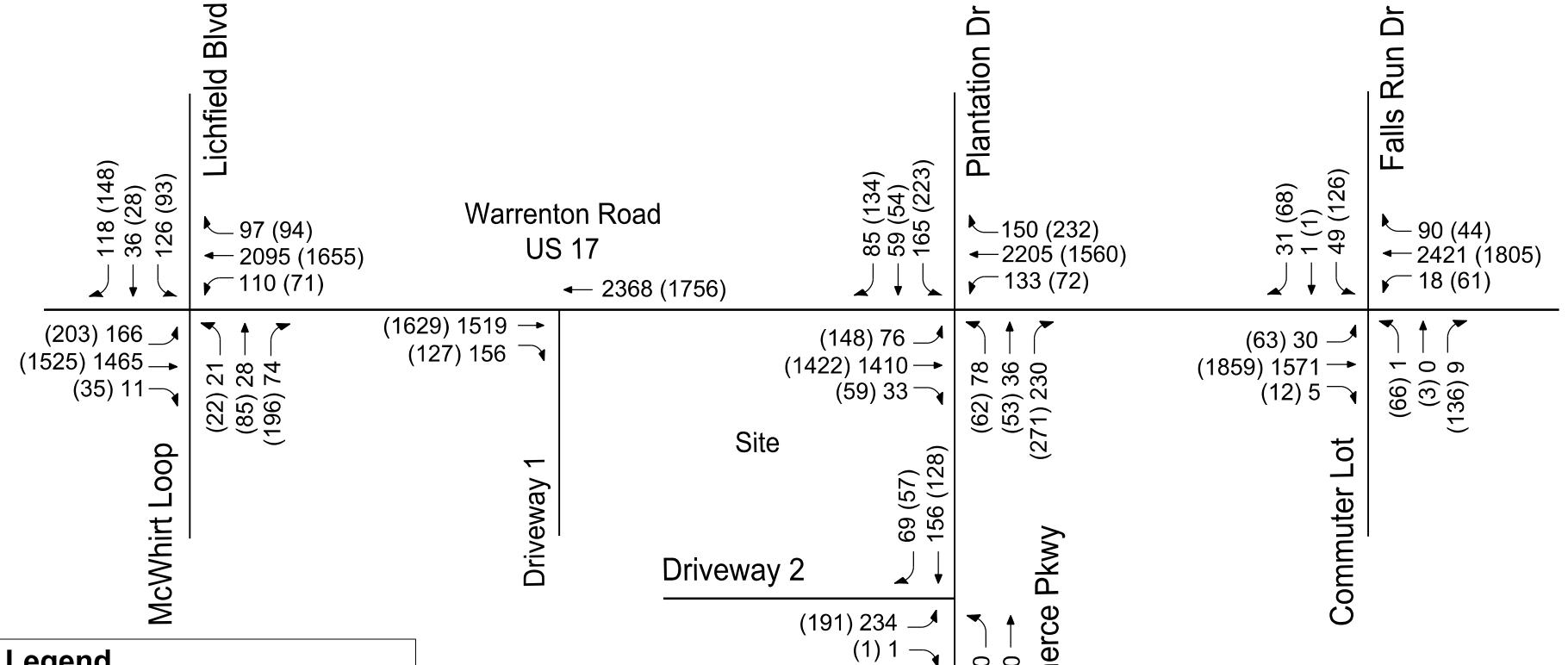


**Bowman**  
CONSULTING

**Proposed Royal Farms**  
**Total Projected Peak Hour Trips**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 8**

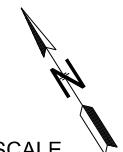
Job # 100284-01-002



### Legend

|              |                      |
|--------------|----------------------|
| 123<br>(123) | AM Peak Hour Traffic |
|              | PM Peak Hour Traffic |
| 55%<br>(55%) | AM Volume Percentage |
|              | PM Volume Percentage |

DRAWING NOT TO SCALE



**Bowman**  
CONSULTING

**2022 Build Traffic Volumes**  
Royal Farms TIA  
Stafford County, Virginia

**Exhibit 9**

Job # 100284-01-002



## **Appendix D**

### **Existing Conditions (2020) Capacity Analysis**

## Lanes, Volumes, Timings

2020 Existing - AM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | ↑↑    | ↑↑↑↑  | ↑     | ↑     | ↑↑↑↑  | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑↑    | ↑     |
| Traffic Volume (vph)       | 74    | 1506  | 32    | 102   | 2168  | 146   | 37    | 13    | 65    | 179   | 19    | 83    |
| Future Volume (vph)        | 74    | 1506  | 32    | 102   | 2168  | 146   | 37    | 13    | 65    | 179   | 19    | 83    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |
| Storage Length (ft)        | 0     |       | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.976 |       | 0.950 | 0.961 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1736  | 1591  | 1664  | 1684  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.976 |       | 0.950 | 0.961 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1736  | 1591  | 1664  | 1684  | 1567  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |
| Satd. Flow (RTOR)          |       |       | 121   |       |       | 155   |       |       | 234   |       |       | 232   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 79    | 1602  | 34    | 109   | 2306  | 155   | 39    | 14    | 69    | 190   | 20    | 88    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       | 33%   |       |       | 45%   |       |       |
| Lane Group Flow (vph)      | 79    | 1602  | 34    | 109   | 2306  | 155   | 26    | 27    | 69    | 104   | 106   | 88    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     |       | 4     | 4     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 8     |       |       | 4     |
| Detector Phase             | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     | 8     | 4     | 4     | 4     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.9  | 14.7  | 14.7  | 14.7  | 14.9  | 14.9  | 14.9  |
| Total Split (s)            | 16.0  | 79.0  | 18.0  | 23.0  | 86.0  | 20.0  | 18.0  | 18.0  | 18.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 11.4% | 56.4% | 12.9% | 16.4% | 61.4% | 14.3% | 12.9% | 12.9% | 12.9% | 14.3% | 14.3% | 14.3% |
| Maximum Green (s)          | 7.5   | 73.0  | 8.3   | 14.4  | 80.0  | 10.1  | 8.3   | 8.3   | 8.3   | 10.1  | 10.1  | 10.1  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.8   | 5.6   | 5.6   | 5.6   | 5.8   | 5.8   | 5.8   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.9   | 4.7   | 4.7   | 4.7   | 4.9   | 4.9   | 4.9   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

2020 Existing - AM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020



| Lane Group              | EBL  | EBT   | EBR  | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None | None | C-Max | None  | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   |      |      |       | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 28.0  |      |      |       | 30.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |      |      |       | 0     |      |      |      |      |      |      |
| Act Effct Green (s)     | 12.0 | 81.1  | 92.7 | 17.3 | 86.3  | 101.2 | 12.3 | 12.3 | 12.3 | 14.8 | 14.8 | 14.8 |
| Actuated g/C Ratio      | 0.09 | 0.58  | 0.66 | 0.12 | 0.62  | 0.72  | 0.09 | 0.09 | 0.09 | 0.11 | 0.11 | 0.11 |
| v/c Ratio               | 0.27 | 0.60  | 0.03 | 0.50 | 0.82  | 0.13  | 0.18 | 0.18 | 0.20 | 0.59 | 0.60 | 0.24 |
| Control Delay           | 49.6 | 9.9   | 0.0  | 62.3 | 20.1  | 1.0   | 61.6 | 61.6 | 1.2  | 74.1 | 74.3 | 1.5  |
| Queue Delay             | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 49.6 | 9.9   | 0.0  | 62.3 | 20.1  | 1.0   | 61.6 | 61.6 | 1.2  | 74.1 | 74.3 | 1.5  |
| LOS                     | D    | A     | A    | E    | C     | A     | E    | E    | A    | E    | E    | A    |
| Approach Delay          |      | 11.6  |      |      |       | 20.7  |      |      | 27.5 |      |      | 52.7 |
| Approach LOS            |      | B     |      |      |       | C     |      |      | C    |      |      | D    |

## Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 120 (86%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 19.6

Intersection LOS: B

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



HCM 6th Signalized Intersection Summary  
1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

2020 Existing - AM

08/24/2020

| Movement   | EBL   | EBT  | EBR  | WBL   | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--|-------|------|------|-------|-------|-------|------|------|------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑     | ↑↑↑↑  | ↑     | ↑↑   | ↑↑   | ↑    | ↑↑   | ↑↑   | ↑    |
| Traffic Volume (veh/h)   | 74    | 1506 | 32   | 102   | 2168  | 146   | 37   | 13   | 65   | 179  | 19   | 83   |
| Future Volume (veh/h)  | 74    | 1506 | 32   | 102   | 2168  | 146   | 37   | 13   | 65   | 179  | 19   | 83   |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |       | No    |       | No   |      | No   | No   |      | No   |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864  | 1701  | 1864  | 1909 | 1909 | 1909 | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 79    | 1602 | 34   | 109   | 2306  | 155   | 26   | 31   | 69   | 204  | 0    | 88   |
| Peak Hour Factor   | 0.94  | 0.94 | 0.94 | 0.94  | 0.94  | 0.94  | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2     | 13    | 2     | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h   | 321   | 2589 | 1058 | 187   | 2721  | 1126  | 164  | 172  | 146  | 371  | 0    | 165  |
| Arrive On Green  | 0.09  | 0.56 | 0.58 | 0.11  | 0.59  | 0.61  | 0.09 | 0.09 | 0.09 | 0.11 | 0.00 | 0.11 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776  | 4645  | 1580  | 1818 | 1909 | 1618 | 3518 | 0    | 1565 |
| Grp Volume(v), veh/h   | 79    | 1602 | 34   | 109   | 2306  | 155   | 26   | 31   | 69   | 204  | 0    | 88   |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776  | 1548  | 1580  | 1818 | 1909 | 1618 | 1759 | 0    | 1565 |
| Q Serve(g_s), s  | 3.0   | 32.6 | 1.0  | 8.2   | 57.2  | 4.4   | 1.8  | 2.1  | 5.7  | 7.7  | 0.0  | 7.5  |
| Cycle Q Clear(g_c), s  | 3.0   | 32.6 | 1.0  | 8.2   | 57.2  | 4.4   | 1.8  | 2.1  | 5.7  | 7.7  | 0.0  | 7.5  |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 321   | 2589 | 1058 | 187   | 2721  | 1126  | 164  | 172  | 146  | 371  | 0    | 165  |
| V/C Ratio(X)   | 0.25  | 0.62 | 0.03 | 0.58  | 0.85  | 0.14  | 0.16 | 0.18 | 0.47 | 0.55 | 0.00 | 0.53 |
| Avail Cap(c_a), veh/h  | 321   | 2589 | 1058 | 241   | 2721  | 1126  | 173  | 181  | 154  | 379  | 0    | 169  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.69  | 0.69  | 0.69  | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh   | 58.9  | 21.1 | 7.9  | 59.7  | 23.9  | 6.4   | 58.8 | 58.9 | 60.5 | 59.5 | 0.0  | 59.4 |
| Incr Delay (d2), s/veh   | 0.4   | 1.1  | 0.1  | 2.0   | 2.5   | 0.2   | 0.4  | 0.5  | 2.4  | 1.6  | 0.0  | 3.1  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 1.3   | 11.5 | 0.5  | 3.7   | 19.8  | 2.1   | 0.9  | 1.0  | 2.4  | 3.5  | 0.0  | 3.1  |
| Unsig. Movement Delay, s/veh   |       |      |      |       |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh  | 59.3  | 22.2 | 8.0  | 61.7  | 26.3  | 6.6   | 59.2 | 59.4 | 62.9 | 61.1 | 0.0  | 62.4 |
| LnGrp LOS  | E     | C    | A    | E     | C     | A     | E    | E    | E    | E    | A    | E    |
| Approach Vol, veh/h  | 1715  |      |      |       | 2570  |       |      |      | 126  |      |      | 292  |
| Approach Delay, s/veh  | 23.6  |      |      |       | 26.6  |       |      |      | 61.3 |      |      | 61.5 |
| Approach LOS   | C     |      |      |       | C     |       |      |      | E    |      |      | E    |
| Timer - Assigned Phs   | 1     | 2    |      | 4     | 5     | 6     |      |      | 8    |      |      |      |
| Phs Duration (G+Y+Rc), s   | 17.0  | 86.0 |      | 19.7  | 18.7  | 84.3  |      |      | 17.3 |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | * 9.9 | * 8.6 | * 8.5 |      |      | 9.7  |      |      |      |
| Max Green Setting (Gmax), s  | * 7.5 | 80.0 |      | * 10  | * 14  | * 73  |      |      | 8.3  |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 5.0   | 59.2 |      | 9.7   | 10.2  | 34.6  |      |      | 7.7  |      |      |      |
| Green Ext Time (p_c), s  | 0.0   | 20.8 |      | 0.0   | 0.1   | 37.2  |      |      | 0.0  |      |      |      |
| Intersection Summary   |       |      |      |       |       |       |      |      |      |      |      |      |
| HCM 6th Ctrl Delay   |       |      |      | 28.6  |       |       |      |      |      |      |      |      |
| HCM 6th LOS  |       |      |      | C     |       |       |      |      |      |      |      |      |
| Notes  |       |      |      |       |       |       |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |       |       |       |      |      |      |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |       |       |       |      |      |      |      |      |      |

### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5676  | 5650  | 5827  | 5547  | 5708  | 5807  | 5876  |
| Vehs Exited             | 5721  | 5663  | 5843  | 5581  | 5734  | 5763  | 5868  |
| Starting Vehs           | 191   | 184   | 176   | 181   | 179   | 153   | 163   |
| Ending Vehs             | 146   | 171   | 160   | 147   | 153   | 197   | 171   |
| Travel Distance (mi)    | 4908  | 4873  | 5026  | 4788  | 4962  | 4975  | 5058  |
| Travel Time (hr)        | 178.5 | 179.3 | 188.4 | 173.7 | 179.1 | 185.6 | 186.8 |
| Total Delay (hr)        | 61.3  | 62.7  | 68.4  | 59.2  | 61.1  | 67.0  | 66.2  |
| Total Stops             | 3575  | 3650  | 3852  | 3510  | 3565  | 3792  | 3794  |
| Fuel Used (gal)         | 173.9 | 173.9 | 180.2 | 169.7 | 175.8 | 179.4 | 180.5 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5871  | 6023  | 5825  | 5780  |
| Vehs Exited             | 5910  | 6016  | 5869  | 5795  |
| Starting Vehs           | 184   | 169   | 205   | 179   |
| Ending Vehs             | 145   | 176   | 161   | 158   |
| Travel Distance (mi)    | 5082  | 5132  | 5064  | 4987  |
| Travel Time (hr)        | 188.7 | 193.1 | 188.7 | 184.2 |
| Total Delay (hr)        | 67.3  | 70.5  | 68.2  | 65.2  |
| Total Stops             | 3823  | 3860  | 3858  | 3726  |
| Fuel Used (gal)         | 182.7 | 185.9 | 182.1 | 178.4 |

### Interval #0 Information Seeding

|                  |      |
|------------------|------|
| Start Time       | 7:45 |
| End Time         | 8:00 |
| Total Time (min) | 15   |

Volumes adjusted by Growth Factors.

No data recorded this interval.

**Interval #1 Information Int 1**

Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1350 | 1435 | 1399 | 1332 | 1309 | 1425 | 1384 |
| Vehs Exited          | 1351 | 1420 | 1375 | 1346 | 1314 | 1403 | 1376 |
| Starting Vehs        | 191  | 184  | 176  | 181  | 179  | 153  | 163  |
| Ending Vehs          | 190  | 199  | 200  | 167  | 174  | 175  | 171  |
| Travel Distance (mi) | 1156 | 1215 | 1206 | 1178 | 1150 | 1198 | 1193 |
| Travel Time (hr)     | 41.3 | 44.8 | 44.3 | 41.4 | 41.5 | 44.0 | 43.9 |
| Total Delay (hr)     | 13.6 | 15.6 | 15.7 | 13.3 | 14.0 | 15.4 | 15.4 |
| Total Stops          | 846  | 928  | 869  | 808  | 859  | 905  | 915  |
| Fuel Used (gal)      | 40.3 | 42.6 | 42.9 | 40.8 | 40.7 | 43.3 | 42.7 |

**Interval #1 Information Int 1**

Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1396 | 1407 | 1372 | 1381 |
| Vehs Exited          | 1417 | 1391 | 1366 | 1374 |
| Starting Vehs        | 184  | 169  | 205  | 179  |
| Ending Vehs          | 163  | 185  | 211  | 183  |
| Travel Distance (mi) | 1230 | 1188 | 1189 | 1190 |
| Travel Time (hr)     | 44.8 | 43.9 | 44.2 | 43.4 |
| Total Delay (hr)     | 15.5 | 15.4 | 15.9 | 15.0 |
| Total Stops          | 918  | 866  | 881  | 881  |
| Fuel Used (gal)      | 44.2 | 43.1 | 42.3 | 42.3 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1563 | 1548 | 1619 | 1532 | 1544 | 1511 | 1540 |
| Vehs Exited          | 1555 | 1548 | 1604 | 1517 | 1537 | 1501 | 1554 |
| Starting Vehs        | 190  | 199  | 200  | 167  | 174  | 175  | 171  |
| Ending Vehs          | 198  | 199  | 215  | 182  | 181  | 185  | 157  |
| Travel Distance (mi) | 1340 | 1339 | 1384 | 1290 | 1326 | 1293 | 1333 |
| Travel Time (hr)     | 49.4 | 50.6 | 53.0 | 47.8 | 48.1 | 49.2 | 49.5 |
| Total Delay (hr)     | 17.4 | 18.6 | 19.8 | 17.1 | 16.6 | 18.5 | 17.8 |
| Total Stops          | 968  | 1028 | 1097 | 961  | 930  | 1025 | 986  |
| Fuel Used (gal)      | 48.0 | 48.2 | 50.0 | 46.2 | 46.9 | 46.3 | 48.2 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1621 | 1600 | 1624 | 1568 |
| Vehs Exited          | 1591 | 1595 | 1633 | 1565 |
| Starting Vehs        | 163  | 185  | 211  | 183  |
| Ending Vehs          | 193  | 190  | 202  | 189  |
| Travel Distance (mi) | 1351 | 1362 | 1380 | 1340 |
| Travel Time (hr)     | 52.0 | 51.5 | 52.8 | 50.4 |
| Total Delay (hr)     | 19.6 | 19.1 | 19.9 | 18.4 |
| Total Stops          | 1074 | 1074 | 1102 | 1023 |
| Fuel Used (gal)      | 49.1 | 49.3 | 50.3 | 48.3 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1403 | 1318 | 1413 | 1387 | 1423 | 1403 | 1507 |
| Vehs Exited          | 1413 | 1352 | 1436 | 1393 | 1416 | 1381 | 1429 |
| Starting Vehs        | 198  | 199  | 215  | 182  | 181  | 185  | 157  |
| Ending Vehs          | 188  | 165  | 192  | 176  | 188  | 207  | 235  |
| Travel Distance (mi) | 1215 | 1143 | 1237 | 1185 | 1235 | 1197 | 1273 |
| Travel Time (hr)     | 44.1 | 41.8 | 46.1 | 43.5 | 45.3 | 45.5 | 46.6 |
| Total Delay (hr)     | 15.1 | 14.4 | 16.5 | 15.1 | 15.9 | 16.7 | 16.2 |
| Total Stops          | 909  | 865  | 940  | 921  | 926  | 958  | 956  |
| Fuel Used (gal)      | 43.1 | 41.0 | 44.0 | 42.7 | 44.1 | 43.3 | 44.7 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1472 | 1550 | 1444 | 1433 |
| Vehs Exited          | 1479 | 1528 | 1427 | 1426 |
| Starting Vehs        | 193  | 190  | 202  | 189  |
| Ending Vehs          | 186  | 212  | 219  | 196  |
| Travel Distance (mi) | 1289 | 1309 | 1255 | 1234 |
| Travel Time (hr)     | 48.1 | 50.6 | 47.2 | 45.9 |
| Total Delay (hr)     | 17.3 | 19.1 | 17.2 | 16.4 |
| Total Stops          | 995  | 1035 | 1013 | 949  |
| Fuel Used (gal)      | 46.7 | 47.6 | 45.1 | 44.2 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1360 | 1349 | 1396 | 1296 | 1432 | 1468 | 1445 |
| Vehs Exited          | 1402 | 1343 | 1428 | 1325 | 1467 | 1478 | 1509 |
| Starting Vehs        | 188  | 165  | 192  | 176  | 188  | 207  | 235  |
| Ending Vehs          | 146  | 171  | 160  | 147  | 153  | 197  | 171  |
| Travel Distance (mi) | 1197 | 1176 | 1198 | 1135 | 1250 | 1287 | 1260 |
| Travel Time (hr)     | 43.7 | 42.1 | 45.0 | 40.9 | 44.2 | 46.9 | 46.8 |
| Total Delay (hr)     | 15.1 | 14.2 | 16.4 | 13.8 | 14.5 | 16.3 | 16.8 |
| Total Stops          | 852  | 829  | 946  | 820  | 850  | 904  | 937  |
| Fuel Used (gal)      | 42.4 | 42.1 | 43.3 | 40.0 | 44.0 | 46.4 | 44.9 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1382 | 1466 | 1385 | 1398 |
| Vehs Exited          | 1423 | 1502 | 1443 | 1430 |
| Starting Vehs        | 186  | 212  | 219  | 196  |
| Ending Vehs          | 145  | 176  | 161  | 158  |
| Travel Distance (mi) | 1211 | 1273 | 1241 | 1223 |
| Travel Time (hr)     | 43.7 | 47.1 | 44.6 | 44.5 |
| Total Delay (hr)     | 14.9 | 16.9 | 15.1 | 15.4 |
| Total Stops          | 836  | 885  | 862  | 871  |
| Fuel Used (gal)      | 42.7 | 45.9 | 44.3 | 43.6 |

Queuing and Blocking Report  
Baseline

2020 Existing - AM  
08/24/2020

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L  |
| Maximum Queue (ft)    | 87  | 69  | 222 | 229 | 202 | 33  | 175 | 408  | 472  | 449  | 50   | 50 |
| Average Queue (ft)    | 37  | 25  | 149 | 142 | 113 | 5   | 87  | 245  | 276  | 286  | 22   | 7  |
| 95th Queue (ft)       | 72  | 60  | 214 | 221 | 195 | 21  | 152 | 387  | 435  | 435  | 49   | 31 |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |    |
| Upstream Blk Time (%) |     |     | 1   | 1   | 0   |     |     |      |      |      |      |    |
| Queuing Penalty (veh) |     |     | 2   | 2   | 0   |     |     |      |      |      |      |    |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     | 0    |      |      |      | 0  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 0    |      |      |      | 0  |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 86  | 60  | 189  | 170  | 110 |
| Average Queue (ft)    | 34  | 25  | 107  | 83   | 40  |
| 95th Queue (ft)       | 73  | 53  | 167  | 154  | 82  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 1   |     |      |      |     |
| Queuing Penalty (veh) | 1   |     |      |      |     |

Intersection: 2: Commerce Pkwy

| Movement              |
|-----------------------|
| Directions Served     |
| Maximum Queue (ft)    |
| Average Queue (ft)    |
| 95th Queue (ft)       |
| Link Distance (ft)    |
| Upstream Blk Time (%) |
| Queuing Penalty (veh) |
| Storage Bay Dist (ft) |
| Storage Blk Time (%)  |
| Queuing Penalty (veh) |

Queuing and Blocking Report  
Baseline

2020 Existing - AM  
08/24/2020

Intersection: 3: Warrenton Road (US 17)

| Movement              | EB | EB | WB  | WB  |
|-----------------------|----|----|-----|-----|
| Directions Served     | T  | T  | T   | T   |
| Maximum Queue (ft)    | 20 | 7  | 14  | 6   |
| Average Queue (ft)    | 1  | 0  | 0   | 0   |
| 95th Queue (ft)       | 9  | 7  | 4   | 4   |
| Link Distance (ft)    | 75 | 75 | 208 | 208 |
| Upstream Blk Time (%) |    |    |     |     |
| Queuing Penalty (veh) |    |    |     |     |
| Storage Bay Dist (ft) |    |    |     |     |
| Storage Blk Time (%)  |    |    |     |     |
| Queuing Penalty (veh) |    |    |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB | EB   | EB   | EB   | WB | WB  | WB   | WB   | WB   | WB | NB  | NB  |
|-----------------------|----|------|------|------|----|-----|------|------|------|----|-----|-----|
| Directions Served     | L  | T    | T    | T    | L  | L   | T    | T    | T    | R  | LT  | R   |
| Maximum Queue (ft)    | 9  | 69   | 119  | 105  | 10 | 39  | 231  | 205  | 174  | 9  | 7   | 32  |
| Average Queue (ft)    | 1  | 4    | 10   | 11   | 1  | 6   | 72   | 52   | 29   | 0  | 0   | 6   |
| 95th Queue (ft)       | 5  | 56   | 75   | 67   | 6  | 25  | 172  | 145  | 102  | 5  | 5   | 24  |
| Link Distance (ft)    |    | 2388 | 2388 | 2388 |    |     | 1184 | 1184 | 1184 |    | 680 | 680 |
| Upstream Blk Time (%) |    |      |      |      |    |     |      |      |      |    |     |     |
| Queuing Penalty (veh) |    |      |      |      |    |     |      |      |      |    |     |     |
| Storage Bay Dist (ft) |    | 375  |      |      |    | 520 | 520  |      |      |    | 235 |     |
| Storage Blk Time (%)  |    |      | 0    |      |    | 0   |      |      |      | 0  |     |     |
| Queuing Penalty (veh) |    |      | 0    |      |    | 0   |      |      |      | 0  |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 2   | 97  | 46  | 64  |
| Average Queue (ft)    | 0   | 32  | 6   | 21  |
| 95th Queue (ft)       | 2   | 79  | 29  | 52  |
| Link Distance (ft)    |     | 833 |     |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 220 |     | 340 | 340 |
| Storage Blk Time (%)  |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |

Queuing and Blocking Report  
Baseline

2020 Existing - AM  
08/24/2020

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 286 | 383  | 360  | 274  | 24   | 103 | 172 | 351 | 336 | 277 | 29  | 115 |
| Average Queue (ft)    | 142 | 223  | 194  | 126  | 2    | 32  | 63  | 174 | 133 | 89  | 6   | 41  |
| 95th Queue (ft)       | 247 | 341  | 304  | 242  | 13   | 81  | 126 | 311 | 268 | 200 | 19  | 89  |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 335  |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  |     | 0    | 1    |      |      |     |     |     | 1   |     |     |     |
| Queuing Penalty (veh) |     | 0    | 1    |      |      |     |     |     | 1   |     |     |     |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|
| Directions Served     | R  | L   | LT  | R   |
| Maximum Queue (ft)    | 72 | 162 | 145 | 150 |
| Average Queue (ft)    | 33 | 78  | 63  | 59  |
| 95th Queue (ft)       | 58 | 138 | 127 | 121 |
| Link Distance (ft)    |    | 464 | 464 |     |
| Upstream Blk Time (%) |    |     |     |     |
| Queuing Penalty (veh) |    |     |     |     |
| Storage Bay Dist (ft) |    | 185 |     | 210 |
| Storage Blk Time (%)  |    |     | 0   |     |
| Queuing Penalty (veh) |    |     | 0   |     |

Network Summary

Network wide Queuing Penalty: 8

## Lanes, Volumes, Timings

2020 Existing - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020

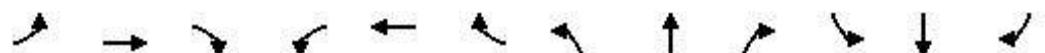
|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group                 |       |       |       |       |       |       |       |       |       |       |       |       |
| Lane Configurations        | ↑↑    | ↑↑↑↑  | ↑     | ↑     | ↑↑↑↑  | ↑     | ↑↑    | ↑     | ↑     | ↑↑    | ↑↑    | ↑     |
| Traffic Volume (vph)       | 144   | 1495  | 57    | 47    | 1536  | 226   | 29    | 34    | 135   | 233   | 21    | 131   |
| Future Volume (vph)        | 144   | 1495  | 57    | 47    | 1536  | 226   | 29    | 34    | 135   | 233   | 21    | 131   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       |       | 1%    |       |       | -1%   |       |       |       | 2%    |
| Storage Length (ft)        | 0     |       | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.996 |       | 0.950 | 0.960 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1771  | 1591  | 1664  | 1682  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.996 |       | 0.950 | 0.960 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1771  | 1591  | 1664  | 1682  | 1567  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |
| Satd. Flow (RTOR)          |       |       | 111   |       |       | 248   |       |       | 217   |       |       | 217   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 158   | 1643  | 63    | 52    | 1688  | 248   | 32    | 37    | 148   | 256   | 23    | 144   |
| Shared Lane Traffic (%)    |       |       |       |       |       |       | 10%   |       |       | 46%   |       |       |
| Lane Group Flow (vph)      | 158   | 1643  | 63    | 52    | 1688  | 248   | 29    | 40    | 148   | 138   | 141   | 144   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  |
| Total Split (s)            | 18.0  | 85.0  | 17.0  | 15.0  | 82.0  | 33.0  | 17.0  | 17.0  | 17.0  | 33.0  | 33.0  | 33.0  |
| Total Split (%)            | 12.0% | 56.7% | 11.3% | 10.0% | 54.7% | 22.0% | 11.3% | 11.3% | 11.3% | 22.0% | 22.0% | 22.0% |
| Maximum Green (s)          | 9.5   | 79.0  | 7.3   | 6.4   | 76.0  | 23.3  | 7.3   | 7.3   | 7.3   | 23.3  | 23.3  | 23.3  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

2020 Existing - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None  | None | C-Max | None  | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   |       |      |       | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 11.0  |       |      |       | 11.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |       |      |       | 0     |      |      |      |      |      |      |
| Act Effct Green (s)     | 14.0 | 88.2  | 104.1 | 12.4 | 83.6  | 110.6 | 12.0 | 12.0 | 12.0 | 23.0 | 23.0 | 23.0 |
| Actuated g/C Ratio      | 0.09 | 0.59  | 0.69  | 0.08 | 0.56  | 0.74  | 0.08 | 0.08 | 0.08 | 0.15 | 0.15 | 0.15 |
| v/c Ratio               | 0.49 | 0.61  | 0.06  | 0.36 | 0.66  | 0.20  | 0.22 | 0.28 | 0.45 | 0.54 | 0.55 | 0.34 |
| Control Delay           | 55.8 | 10.1  | 0.1   | 55.5 | 29.1  | 0.9   | 68.6 | 70.3 | 5.1  | 65.9 | 66.0 | 2.3  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 55.8 | 10.1  | 0.1   | 55.5 | 29.1  | 0.9   | 68.6 | 70.3 | 5.1  | 65.9 | 66.0 | 2.3  |
| LOS                     | E    | B     | A     | E    | C     | A     | E    | E    | A    | E    | E    | A    |
| Approach Delay          |      | 13.6  |       |      |       | 26.2  |      |      | 25.6 |      |      | 44.3 |
| Approach LOS            |      | B     |       |      |       | C     |      |      | C    |      |      | D    |

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 49 (33%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 22.7

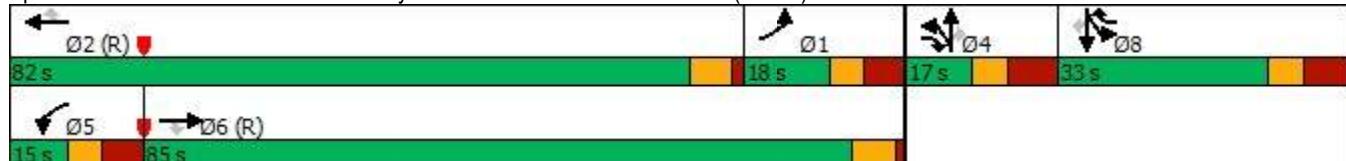
Intersection LOS: C

Intersection Capacity Utilization 58.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



HCM 6th Signalized Intersection Summary  
1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

2020 Existing - PM

08/24/2020

| Movement   | EBL   | EBT  | EBR  | WBL  | WBT   | WBR   | NBL  | NBT   | NBR   | SBL  | SBT  | SBR  |
|--|-------|------|------|------|-------|-------|------|-------|-------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑    | ↑↑↑↑  | ↑     | ↑↑   | ↑↑    | ↑↑    | ↑↑   | ↑↑   | ↑↑   |
| Traffic Volume (veh/h)   | 144   | 1495 | 57   | 47   | 1536  | 226   | 29   | 34    | 135   | 233  | 21   | 131  |
| Future Volume (veh/h)  | 144   | 1495 | 57   | 47   | 1536  | 226   | 29   | 34    | 135   | 233  | 21   | 131  |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0    | 0     | 0     | 0    | 0     | 0     | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |       | 1.00  | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |      | No    |       | No   |       | No    |      | No   |      |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864 | 1701  | 1864  | 1909 | 1909  | 1909  | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 158   | 1643 | 63   | 52   | 1688  | 248   | 32   | 37    | 148   | 272  | 0    | 144  |
| Peak Hour Factor   | 0.91  | 0.91 | 0.91 | 0.91 | 0.91  | 0.91  | 0.91 | 0.91  | 0.91  | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2    | 13    | 2     | 2    | 2     | 2     | 2    | 2    | 2    |
| Cap, veh/h   | 489   | 2691 | 1077 | 120  | 2415  | 1075  | 149  | 157   | 133   | 495  | 0    | 220  |
| Arrive On Green  | 0.14  | 0.58 | 0.60 | 0.07 | 0.52  | 0.54  | 0.08 | 0.08  | 0.08  | 0.14 | 0.00 | 0.14 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776 | 4645  | 1580  | 1818 | 1909  | 1618  | 3518 | 0    | 1565 |
| Grp Volume(v), veh/h   | 158   | 1643 | 63   | 52   | 1688  | 248   | 32   | 37    | 148   | 272  | 0    | 144  |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776 | 1548  | 1580  | 1818 | 1909  | 1618  | 1759 | 0    | 1565 |
| Q Serve(g_s), s  | 6.2   | 34.5 | 2.0  | 4.2  | 41.1  | 8.9   | 2.5  | 2.7   | 12.3  | 10.8 | 0.0  | 13.1 |
| Cycle Q Clear(g_c), s  | 6.2   | 34.5 | 2.0  | 4.2  | 41.1  | 8.9   | 2.5  | 2.7   | 12.3  | 10.8 | 0.0  | 13.1 |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |       | 1.00  | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 489   | 2691 | 1077 | 120  | 2415  | 1075  | 149  | 157   | 133   | 495  | 0    | 220  |
| V/C Ratio(X)   | 0.32  | 0.61 | 0.06 | 0.43 | 0.70  | 0.23  | 0.21 | 0.24  | 1.12  | 0.55 | 0.00 | 0.65 |
| Avail Cap(c_a), veh/h  | 489   | 2691 | 1077 | 130  | 2415  | 1075  | 149  | 157   | 133   | 664  | 0    | 295  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.72 | 0.72  | 0.72  | 1.00 | 1.00  | 1.00  | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh   | 57.9  | 20.7 | 8.0  | 67.2 | 27.1  | 9.1   | 64.3 | 64.5  | 68.8  | 60.0 | 0.0  | 61.0 |
| Incr Delay (d2), s/veh   | 0.4   | 1.0  | 0.1  | 1.8  | 1.2   | 0.4   | 0.7  | 0.8   | 112.5 | 1.0  | 0.0  | 3.3  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 2.7   | 12.2 | 0.9  | 2.0  | 14.8  | 4.7   | 1.2  | 1.4   | 9.2   | 4.9  | 0.0  | 5.4  |
| Unsig. Movement Delay, s/veh   |       |      |      |      |       |       |      |       |       |      |      |      |
| LnGrp Delay(d), s/veh  | 58.3  | 21.7 | 8.1  | 69.0 | 28.4  | 9.4   | 65.0 | 65.2  | 181.3 | 61.0 | 0.0  | 64.3 |
| LnGrp LOS  | E     | C    | A    | E    | C     | A     | E    | E     | F     | E    | A    | E    |
| Approach Vol, veh/h  |       | 1864 |      |      | 1988  |       |      | 217   |       |      | 416  |      |
| Approach Delay, s/veh  |       | 24.4 |      |      | 27.1  |       |      | 144.4 |       |      | 62.1 |      |
| Approach LOS   |       | C    |      |      | C     |       |      | F     |       |      | E    |      |
| Timer - Assigned Phs   | 1     | 2    |      | 4    | 5     | 6     |      | 8     |       |      |      |      |
| Phs Duration (G+Y+Rc), s   | 25.2  | 82.0 |      | 17.0 | 14.1  | 93.1  |      | 25.8  |       |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | 9.7  | * 8.6 | * 8.5 |      | 9.7   |       |      |      |      |
| Max Green Setting (Gmax), s  | * 9.5 | 76.0 |      | 7.3  | * 6.4 | * 79  |      | 23.3  |       |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 8.2   | 43.1 |      | 14.3 | 6.2   | 36.5  |      | 15.1  |       |      |      |      |
| Green Ext Time (p_c), s  | 0.1   | 32.1 |      | 0.0  | 0.0   | 41.2  |      | 1.0   |       |      |      |      |
| Intersection Summary   |       |      |      |      |       |       |      |       |       |      |      |      |
| HCM 6th Ctrl Delay   |       |      | 34.9 |      |       |       |      |       |       |      |      |      |
| HCM 6th LOS  |       |      | C    |      |       |       |      |       |       |      |      |      |
| Notes  |       |      |      |      |       |       |      |       |       |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |      |       |       |      |       |       |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |      |       |       |      |       |       |      |      |      |

### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5892  | 5791  | 5662  | 5763  | 5647  | 5707  | 5598  |
| Vehs Exited             | 5916  | 5815  | 5683  | 5779  | 5706  | 5720  | 5626  |
| Starting Vehs           | 221   | 197   | 197   | 196   | 232   | 202   | 198   |
| Ending Vehs             | 197   | 173   | 176   | 180   | 173   | 189   | 170   |
| Travel Distance (mi)    | 4919  | 4882  | 4747  | 4801  | 4735  | 4747  | 4715  |
| Travel Time (hr)        | 206.6 | 205.6 | 202.9 | 201.0 | 196.7 | 197.1 | 193.9 |
| Total Delay (hr)        | 85.2  | 84.8  | 85.4  | 82.5  | 79.5  | 79.5  | 77.3  |
| Total Stops             | 5114  | 5174  | 5197  | 5104  | 4910  | 5029  | 4845  |
| Fuel Used (gal)         | 189.4 | 187.0 | 182.0 | 184.3 | 179.7 | 180.6 | 179.5 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5796  | 5569  | 5712  | 5713  |
| Vehs Exited             | 5827  | 5608  | 5707  | 5740  |
| Starting Vehs           | 206   | 211   | 185   | 204   |
| Ending Vehs             | 175   | 172   | 190   | 178   |
| Travel Distance (mi)    | 4829  | 4664  | 4771  | 4781  |
| Travel Time (hr)        | 204.2 | 194.4 | 202.5 | 200.5 |
| Total Delay (hr)        | 84.5  | 78.8  | 84.5  | 82.2  |
| Total Stops             | 5111  | 4967  | 5098  | 5054  |
| Fuel Used (gal)         | 186.3 | 177.7 | 182.8 | 182.9 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 4:45 |
| End Time                            | 5:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

**Interval #1 Information Int 1**

Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1412 | 1427 | 1436 | 1414 | 1360 | 1366 | 1334 |
| Vehs Exited          | 1452 | 1409 | 1442 | 1425 | 1383 | 1391 | 1346 |
| Starting Vehs        | 221  | 197  | 197  | 196  | 232  | 202  | 198  |
| Ending Vehs          | 181  | 215  | 191  | 185  | 209  | 177  | 186  |
| Travel Distance (mi) | 1178 | 1209 | 1209 | 1173 | 1130 | 1173 | 1134 |
| Travel Time (hr)     | 49.2 | 50.8 | 51.7 | 49.7 | 46.9 | 46.7 | 46.1 |
| Total Delay (hr)     | 20.0 | 20.9 | 21.8 | 20.6 | 18.9 | 18.0 | 18.1 |
| Total Stops          | 1236 | 1328 | 1317 | 1286 | 1193 | 1171 | 1112 |
| Fuel Used (gal)      | 45.5 | 46.6 | 47.1 | 45.1 | 43.0 | 43.9 | 43.1 |

**Interval #1 Information Int 1**

Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1417 | 1380 | 1404 | 1394 |
| Vehs Exited          | 1443 | 1396 | 1391 | 1407 |
| Starting Vehs        | 206  | 211  | 185  | 204  |
| Ending Vehs          | 180  | 195  | 198  | 186  |
| Travel Distance (mi) | 1193 | 1145 | 1151 | 1170 |
| Travel Time (hr)     | 49.5 | 48.1 | 47.9 | 48.7 |
| Total Delay (hr)     | 20.1 | 19.7 | 19.5 | 19.8 |
| Total Stops          | 1262 | 1230 | 1194 | 1235 |
| Fuel Used (gal)      | 45.7 | 43.9 | 43.6 | 44.8 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1635 | 1570 | 1469 | 1527 | 1537 | 1519 | 1514 |
| Vehs Exited          | 1586 | 1561 | 1463 | 1475 | 1522 | 1479 | 1481 |
| Starting Vehs        | 181  | 215  | 191  | 185  | 209  | 177  | 186  |
| Ending Vehs          | 230  | 224  | 197  | 237  | 224  | 217  | 219  |
| Travel Distance (mi) | 1343 | 1325 | 1227 | 1258 | 1297 | 1244 | 1271 |
| Travel Time (hr)     | 58.2 | 56.9 | 52.8 | 53.8 | 54.2 | 52.9 | 52.8 |
| Total Delay (hr)     | 25.0 | 24.3 | 22.5 | 22.8 | 22.2 | 21.9 | 21.4 |
| Total Stops          | 1439 | 1397 | 1349 | 1350 | 1294 | 1348 | 1337 |
| Fuel Used (gal)      | 52.4 | 51.2 | 47.0 | 48.4 | 49.3 | 48.0 | 48.2 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1563 | 1484 | 1525 | 1534 |
| Vehs Exited          | 1526 | 1481 | 1513 | 1510 |
| Starting Vehs        | 180  | 195  | 198  | 186  |
| Ending Vehs          | 217  | 198  | 210  | 216  |
| Travel Distance (mi) | 1290 | 1231 | 1275 | 1276 |
| Travel Time (hr)     | 55.3 | 52.2 | 54.9 | 54.4 |
| Total Delay (hr)     | 23.5 | 21.8 | 23.4 | 22.9 |
| Total Stops          | 1395 | 1326 | 1351 | 1359 |
| Fuel Used (gal)      | 50.2 | 47.4 | 48.7 | 49.1 |

**Interval #3 Information Int 3**

Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1407 | 1410 | 1336 | 1421 | 1361 | 1405 | 1351 |
| Vehs Exited          | 1459 | 1445 | 1348 | 1471 | 1390 | 1411 | 1363 |
| Starting Vehs        | 230  | 224  | 197  | 237  | 224  | 217  | 219  |
| Ending Vehs          | 178  | 189  | 185  | 187  | 195  | 211  | 207  |
| Travel Distance (mi) | 1202 | 1183 | 1130 | 1217 | 1156 | 1165 | 1136 |
| Travel Time (hr)     | 48.8 | 50.1 | 48.1 | 49.6 | 48.6 | 49.4 | 46.5 |
| Total Delay (hr)     | 19.3 | 20.6 | 20.2 | 19.8 | 20.0 | 20.5 | 18.2 |
| Total Stops          | 1180 | 1252 | 1245 | 1194 | 1249 | 1270 | 1158 |
| Fuel Used (gal)      | 45.6 | 45.2 | 42.7 | 46.7 | 44.1 | 44.4 | 42.9 |

**Interval #3 Information Int 3**

Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1413 | 1354 | 1403 | 1384 |
| Vehs Exited          | 1410 | 1377 | 1429 | 1409 |
| Starting Vehs        | 217  | 198  | 210  | 216  |
| Ending Vehs          | 220  | 175  | 184  | 192  |
| Travel Distance (mi) | 1157 | 1158 | 1212 | 1172 |
| Travel Time (hr)     | 48.7 | 47.3 | 50.7 | 48.8 |
| Total Delay (hr)     | 20.1 | 18.6 | 20.8 | 19.8 |
| Total Stops          | 1212 | 1202 | 1273 | 1226 |
| Fuel Used (gal)      | 44.8 | 43.5 | 46.1 | 44.6 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1438 | 1384 | 1421 | 1401 | 1389 | 1417 | 1399 |
| Vehs Exited          | 1419 | 1400 | 1430 | 1408 | 1411 | 1439 | 1436 |
| Starting Vehs        | 178  | 189  | 185  | 187  | 195  | 211  | 207  |
| Ending Vehs          | 197  | 173  | 176  | 180  | 173  | 189  | 170  |
| Travel Distance (mi) | 1195 | 1166 | 1181 | 1153 | 1152 | 1165 | 1173 |
| Travel Time (hr)     | 50.4 | 47.8 | 50.2 | 48.0 | 47.1 | 48.0 | 48.5 |
| Total Delay (hr)     | 20.9 | 18.9 | 20.9 | 19.4 | 18.4 | 19.1 | 19.6 |
| Total Stops          | 1259 | 1197 | 1286 | 1274 | 1174 | 1240 | 1238 |
| Fuel Used (gal)      | 45.8 | 44.0 | 45.2 | 44.2 | 43.3 | 44.2 | 45.3 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1403 | 1351 | 1380 | 1397 |
| Vehs Exited          | 1448 | 1354 | 1374 | 1410 |
| Starting Vehs        | 220  | 175  | 184  | 192  |
| Ending Vehs          | 175  | 172  | 190  | 178  |
| Travel Distance (mi) | 1189 | 1130 | 1134 | 1164 |
| Travel Time (hr)     | 50.6 | 46.9 | 48.9 | 48.6 |
| Total Delay (hr)     | 20.9 | 18.7 | 20.7 | 19.8 |
| Total Stops          | 1242 | 1209 | 1280 | 1240 |
| Fuel Used (gal)      | 45.6 | 42.9 | 44.4 | 44.5 |

Queuing and Blocking Report  
Baseline

2020 Existing - PM  
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Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L  |
| Maximum Queue (ft)    | 145 | 131 | 218 | 217 | 208 | 29  | 157 | 388  | 451  | 452  | 76   | 92 |
| Average Queue (ft)    | 67  | 55  | 136 | 121 | 103 | 5   | 50  | 221  | 257  | 264  | 29   | 9  |
| 95th Queue (ft)       | 120 | 108 | 201 | 200 | 185 | 20  | 117 | 367  | 409  | 414  | 64   | 45 |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |    |
| Upstream Blk Time (%) |     |     | 0   | 0   | 0   |     |     |      |      |      |      |    |
| Queuing Penalty (veh) |     |     | 1   | 1   | 1   |     |     |      |      |      |      |    |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      | 0    |      |      | 0  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      | 0    |      |      | 0  |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 141 | 156 | 211  | 190  | 116 |
| Average Queue (ft)    | 52  | 51  | 130  | 107  | 49  |
| 95th Queue (ft)       | 107 | 104 | 193  | 180  | 89  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) | 0   | 0   |      |      |     |
| Queuing Penalty (veh) | 0   | 0   |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 7   | 0   |      |      |     |
| Queuing Penalty (veh) | 11  | 0   |      |      |     |

Intersection: 2: Commerce Pkwy

| Movement              |
|-----------------------|
| Directions Served     |
| Maximum Queue (ft)    |
| Average Queue (ft)    |
| 95th Queue (ft)       |
| Link Distance (ft)    |
| Upstream Blk Time (%) |
| Queuing Penalty (veh) |
| Storage Bay Dist (ft) |
| Storage Blk Time (%)  |
| Queuing Penalty (veh) |

Queuing and Blocking Report  
Baseline

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Intersection: 3: Warrenton Road (US 17)

| Movement              | EB | EB | EB |
|-----------------------|----|----|----|
| Directions Served     | T  | T  | T  |
| Maximum Queue (ft)    | 2  | 9  | 4  |
| Average Queue (ft)    | 0  | 0  | 0  |
| 95th Queue (ft)       | 2  | 6  | 4  |
| Link Distance (ft)    | 75 | 75 | 75 |
| Upstream Blk Time (%) |    |    |    |
| Queuing Penalty (veh) |    |    |    |
| Storage Bay Dist (ft) |    |    |    |
| Storage Blk Time (%)  |    |    |    |
| Queuing Penalty (veh) |    |    |    |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB | WB  | WB  | WB   | WB   | WB   | WB  | NB  |
|-----------------------|-----|------|------|------|----|-----|-----|------|------|------|-----|-----|
| Directions Served     | L   | T    | T    | T    | R  | L   | L   | T    | T    | T    | R   | LT  |
| Maximum Queue (ft)    | 123 | 236  | 224  | 224  | 4  | 45  | 94  | 386  | 365  | 332  | 87  | 139 |
| Average Queue (ft)    | 45  | 90   | 109  | 111  | 0  | 6   | 36  | 232  | 191  | 153  | 3   | 60  |
| 95th Queue (ft)       | 98  | 182  | 195  | 198  | 3  | 31  | 81  | 355  | 324  | 284  | 52  | 115 |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |    |     |     | 1184 | 1184 | 1184 |     | 680 |
| Upstream Blk Time (%) |     |      |      |      |    |     |     |      |      |      |     |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      |     |     |
| Storage Bay Dist (ft) |     | 375  |      |      |    | 350 | 520 | 520  |      |      | 235 |     |
| Storage Blk Time (%)  |     |      |      |      |    |     |     |      |      |      | 1   |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      | 1   |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB  | SB  | SB  |  |
|-----------------------|-----|-----|-----|-----|-----|--|
| Directions Served     | R   | R   | L   | LT  | R   |  |
| Maximum Queue (ft)    | 148 | 110 | 167 | 142 | 71  |  |
| Average Queue (ft)    | 66  | 15  | 86  | 38  | 31  |  |
| 95th Queue (ft)       | 124 | 61  | 152 | 113 | 57  |  |
| Link Distance (ft)    | 680 |     | 833 |     |     |  |
| Upstream Blk Time (%) |     |     |     |     |     |  |
| Queuing Penalty (veh) |     |     |     |     |     |  |
| Storage Bay Dist (ft) |     | 220 |     | 340 | 340 |  |
| Storage Blk Time (%)  |     |     |     |     |     |  |
| Queuing Penalty (veh) |     |     |     |     |     |  |

Queuing and Blocking Report  
Baseline

2020 Existing - PM  
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Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 321 | 392  | 370  | 298  | 39   | 66  | 91  | 327 | 281 | 168 | 36  | 256 |
| Average Queue (ft)    | 175 | 242  | 211  | 153  | 8    | 16  | 42  | 165 | 122 | 77  | 5   | 131 |
| 95th Queue (ft)       | 287 | 359  | 327  | 269  | 28   | 46  | 78  | 283 | 230 | 144 | 20  | 257 |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 335 |      |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  | 0   | 1    |      |      |      |     |     | 0   |     |     |     | 5   |
| Queuing Penalty (veh) | 1   | 2    |      |      |      |     |     | 0   |     |     |     | 10  |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 213 | 134 | 124 | 140 |
| Average Queue (ft)    | 78  | 61  | 47  | 57  |
| 95th Queue (ft)       | 169 | 115 | 106 | 112 |
| Link Distance (ft)    |     | 464 | 464 |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 185 |     | 210 |     |
| Storage Blk Time (%)  | 1   |     |     |     |
| Queuing Penalty (veh) | 1   |     |     |     |

Network Summary

Network wide Queuing Penalty: 28



## **Appendix E**

### **No Build Conditions (2022) Capacity Analysis**

## Lanes, Volumes, Timings

1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group Configurations  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Traffic Volume (vph)       | 76    | 1544  | 33    | 104   | 2223  | 150   | 38    | 14    | 67    | 183   | 19    | 85    |
| Future Volume (vph)        | 76    | 1544  | 33    | 104   | 2223  | 150   | 38    | 14    | 67    | 183   | 19    | 85    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |       |
| Storage Length (ft)        | 0     |       | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.977 |       | 0.950 | 0.961 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1738  | 1591  | 1664  | 1684  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.977 |       | 0.950 | 0.961 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1738  | 1591  | 1664  | 1684  | 1567  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |
| Satd. Flow (RTOR)          |       |       | 121   |       |       | 160   |       |       | 234   |       |       | 232   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 81    | 1643  | 35    | 111   | 2365  | 160   | 40    | 15    | 71    | 195   | 20    | 90    |
| Shared Lane Traffic (%)    |       |       |       |       |       | 32%   |       |       | 45%   |       |       |       |
| Lane Group Flow (vph)      | 81    | 1643  | 35    | 111   | 2365  | 160   | 27    | 28    | 71    | 107   | 108   | 90    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     |       | 4     | 4     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 8     |       |       | 4     |
| Detector Phase             | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     | 8     | 4     | 4     | 4     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.9  | 14.7  | 14.7  | 14.7  | 14.9  | 14.9  | 14.9  |
| Total Split (s)            | 16.0  | 79.0  | 18.0  | 23.0  | 86.0  | 20.0  | 18.0  | 18.0  | 18.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 11.4% | 56.4% | 12.9% | 16.4% | 61.4% | 14.3% | 12.9% | 12.9% | 12.9% | 14.3% | 14.3% | 14.3% |
| Maximum Green (s)          | 7.5   | 73.0  | 8.3   | 14.4  | 80.0  | 10.1  | 8.3   | 8.3   | 8.3   | 10.1  | 10.1  | 10.1  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.8   | 5.6   | 5.6   | 5.6   | 5.8   | 5.8   | 5.8   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.9   | 4.7   | 4.7   | 4.7   | 4.9   | 4.9   | 4.9   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

08/24/2020



| Lane Group              | EBL  | EBT   | EBR  | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None | None | C-Max | None  | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   |      |      |       | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 28.0  |      |      |       | 30.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |      |      |       | 0     |      |      |      |      |      |      |
| Act Effect Green (s)    | 12.0 | 80.9  | 92.5 | 17.4 | 86.3  | 101.2 | 12.3 | 12.3 | 12.3 | 14.8 | 14.8 | 14.8 |
| Actuated g/C Ratio      | 0.09 | 0.58  | 0.66 | 0.12 | 0.62  | 0.72  | 0.09 | 0.09 | 0.09 | 0.11 | 0.11 | 0.11 |
| v/c Ratio               | 0.28 | 0.62  | 0.03 | 0.51 | 0.84  | 0.14  | 0.18 | 0.18 | 0.20 | 0.61 | 0.61 | 0.24 |
| Control Delay           | 49.4 | 10.2  | 0.1  | 64.7 | 16.6  | 0.8   | 61.8 | 61.7 | 1.3  | 75.1 | 74.9 | 1.5  |
| Queue Delay             | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 49.4 | 10.2  | 0.1  | 64.7 | 16.6  | 0.8   | 61.8 | 61.7 | 1.3  | 75.1 | 74.9 | 1.5  |
| LOS                     | D    | B     | A    | E    | B     | A     | E    | E    | A    | E    | E    | A    |
| Approach Delay          |      | 11.8  |      |      |       | 17.6  |      |      | 27.7 |      |      | 53.3 |
| Approach LOS            |      | B     |      |      |       | B     |      |      | C    |      |      | D    |

### Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 120 (86%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 18.0

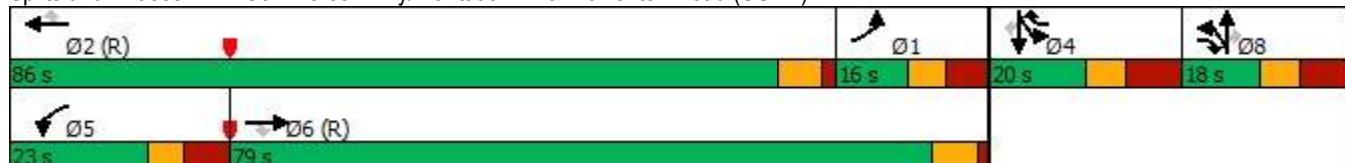
Intersection LOS: B

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)



## HCM 6th Signalized Intersection Summary

1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020

| Movement   | EBL   | EBT  | EBR  | WBL   | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--|-------|------|------|-------|-------|-------|------|------|------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑     | ↑↑↑↑  | ↑     | ↑↑   | ↑    | ↑    | ↑    | ↑↑   | ↑    |
| Traffic Volume (veh/h)   | 76    | 1544 | 33   | 104   | 2223  | 150   | 38   | 14   | 67   | 183  | 19   | 85   |
| Future Volume (veh/h)  | 76    | 1544 | 33   | 104   | 2223  | 150   | 38   | 14   | 67   | 183  | 19   | 85   |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |       | No    |       | No   |      | No   |      | No   |      |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864  | 1701  | 1864  | 1909 | 1909 | 1909 | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 81    | 1643 | 35   | 111   | 2365  | 160   | 28   | 32   | 71   | 209  | 0    | 90   |
| Peak Hour Factor   | 0.94  | 0.94 | 0.94 | 0.94  | 0.94  | 0.94  | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2     | 13    | 2     | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h   | 313   | 2573 | 1054 | 189   | 2721  | 1128  | 166  | 175  | 148  | 375  | 0    | 167  |
| Arrive On Green  | 0.09  | 0.55 | 0.57 | 0.11  | 0.59  | 0.61  | 0.09 | 0.09 | 0.09 | 0.11 | 0.00 | 0.11 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776  | 4645  | 1580  | 1818 | 1909 | 1618 | 3518 | 0    | 1565 |
| Grp Volume(v), veh/h   | 81    | 1643 | 35   | 111   | 2365  | 160   | 28   | 32   | 71   | 209  | 0    | 90   |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776  | 1548  | 1580  | 1818 | 1909 | 1618 | 1759 | 0    | 1565 |
| Q Serve(g_s), s  | 3.1   | 34.1 | 1.1  | 8.3   | 60.2  | 4.5   | 2.0  | 2.2  | 5.8  | 7.9  | 0.0  | 7.6  |
| Cycle Q Clear(g_c), s  | 3.1   | 34.1 | 1.1  | 8.3   | 60.2  | 4.5   | 2.0  | 2.2  | 5.8  | 7.9  | 0.0  | 7.6  |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 313   | 2573 | 1054 | 189   | 2721  | 1128  | 166  | 175  | 148  | 375  | 0    | 167  |
| V/C Ratio(X)   | 0.26  | 0.64 | 0.03 | 0.59  | 0.87  | 0.14  | 0.17 | 0.18 | 0.48 | 0.56 | 0.00 | 0.54 |
| Avail Cap(c_a), veh/h  | 313   | 2573 | 1054 | 241   | 2721  | 1128  | 173  | 181  | 154  | 379  | 0    | 169  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.61  | 0.61  | 0.61  | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh   | 59.3  | 21.7 | 8.0  | 59.6  | 24.5  | 6.4   | 58.7 | 58.8 | 60.4 | 59.4 | 0.0  | 59.3 |
| Incr Delay (d2), s/veh   | 0.4   | 1.2  | 0.1  | 1.8   | 2.6   | 0.2   | 0.5  | 0.5  | 2.4  | 1.8  | 0.0  | 3.3  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 1.3   | 12.0 | 0.5  | 3.8   | 20.8  | 2.1   | 0.9  | 1.1  | 2.5  | 3.6  | 0.0  | 3.2  |
| Unsig. Movement Delay, s/veh   |       |      |      |       |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh  | 59.7  | 22.9 | 8.1  | 61.4  | 27.0  | 6.5   | 59.2 | 59.3 | 62.8 | 61.2 | 0.0  | 62.6 |
| LnGrp LOS  | E     | C    | A    | E     | C     | A     | E    | E    | E    | E    | A    | E    |
| Approach Vol, veh/h  | 1759  |      |      | 2636  |       |       | 131  |      |      | 299  |      |      |
| Approach Delay, s/veh  | 24.3  |      |      | 27.3  |       |       | 61.2 |      |      | 61.6 |      |      |
| Approach LOS   | C     |      |      | C     |       |       | E    |      |      | E    |      |      |
| Timer - Assigned Phs   | 1     | 2    |      | 4     | 5     | 6     |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s   | 16.7  | 86.0 |      | 19.8  | 18.9  | 83.8  |      | 17.5 |      |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | * 9.9 | * 8.6 | * 8.5 |      | 9.7  |      |      |      |      |
| Max Green Setting (Gmax), s  | * 7.5 | 80.0 |      | * 10  | * 14  | * 73  |      | 8.3  |      |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 5.1   | 62.2 |      | 9.9   | 10.3  | 36.1  |      | 7.8  |      |      |      |      |
| Green Ext Time (p_c), s  | 0.0   | 17.8 |      | 0.0   | 0.1   | 35.9  |      | 0.0  |      |      |      |      |
| <b>Intersection Summary</b>  |       |      |      |       |       |       |      |      |      |      |      |      |
| HCM 6th Ctrl Delay   |       |      | 29.2 |       |       |       |      |      |      |      |      |      |
| HCM 6th LOS  |       |      | C    |       |       |       |      |      |      |      |      |      |
| <b>Notes</b>   |       |      |      |       |       |       |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |       |       |       |      |      |      |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |       |       |       |      |      |      |      |      |      |

### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6024  | 5975  | 5913  | 5948  | 5931  | 5826  | 5898  |
| Vehs Exited             | 6006  | 6004  | 5966  | 5974  | 5965  | 5816  | 5906  |
| Starting Vehs           | 181   | 212   | 213   | 189   | 206   | 171   | 179   |
| Ending Vehs             | 199   | 183   | 160   | 163   | 172   | 181   | 171   |
| Travel Distance (mi)    | 5173  | 5191  | 5147  | 5162  | 5129  | 5071  | 5105  |
| Travel Time (hr)        | 201.2 | 197.3 | 198.7 | 196.3 | 193.4 | 193.3 | 193.7 |
| Total Delay (hr)        | 77.3  | 73.3  | 75.6  | 73.0  | 70.8  | 72.3  | 72.3  |
| Total Stops             | 4235  | 4032  | 4150  | 3989  | 3933  | 4066  | 3957  |
| Fuel Used (gal)         | 189.6 | 188.9 | 188.3 | 186.8 | 186.5 | 184.0 | 186.5 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5888  | 5851  | 5941  | 5918  |
| Vehs Exited             | 5878  | 5905  | 5929  | 5935  |
| Starting Vehs           | 166   | 202   | 176   | 190   |
| Ending Vehs             | 176   | 148   | 188   | 173   |
| Travel Distance (mi)    | 5076  | 5063  | 5129  | 5125  |
| Travel Time (hr)        | 189.5 | 192.5 | 191.6 | 194.7 |
| Total Delay (hr)        | 68.2  | 71.8  | 69.3  | 72.4  |
| Total Stops             | 3866  | 3996  | 3766  | 3998  |
| Fuel Used (gal)         | 183.3 | 184.1 | 186.0 | 186.4 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 7:45 |
| End Time                            | 8:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

**Interval #1 Information Int 1**

Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1408 | 1464 | 1489 | 1396 | 1460 | 1323 | 1459 |
| Vehs Exited          | 1401 | 1497 | 1487 | 1383 | 1491 | 1326 | 1430 |
| Starting Vehs        | 181  | 212  | 213  | 189  | 206  | 171  | 179  |
| Ending Vehs          | 188  | 179  | 215  | 202  | 175  | 168  | 208  |
| Travel Distance (mi) | 1214 | 1288 | 1316 | 1195 | 1256 | 1165 | 1259 |
| Travel Time (hr)     | 45.1 | 47.8 | 50.3 | 44.5 | 46.9 | 42.2 | 47.0 |
| Total Delay (hr)     | 16.0 | 17.0 | 18.8 | 16.0 | 16.9 | 14.5 | 17.1 |
| Total Stops          | 913  | 957  | 997  | 858  | 933  | 823  | 991  |
| Fuel Used (gal)      | 43.7 | 46.7 | 48.6 | 43.2 | 45.5 | 41.6 | 45.8 |

**Interval #1 Information Int 1**

Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1408 | 1442 | 1443 | 1427 |
| Vehs Exited          | 1402 | 1437 | 1432 | 1428 |
| Starting Vehs        | 166  | 202  | 176  | 190  |
| Ending Vehs          | 172  | 207  | 187  | 190  |
| Travel Distance (mi) | 1201 | 1264 | 1244 | 1240 |
| Travel Time (hr)     | 45.2 | 47.9 | 46.1 | 46.3 |
| Total Delay (hr)     | 16.4 | 17.9 | 16.5 | 16.7 |
| Total Stops          | 925  | 1008 | 912  | 931  |
| Fuel Used (gal)      | 43.5 | 46.0 | 45.3 | 45.0 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1643 | 1590 | 1602 | 1666 | 1641 | 1643 | 1564 |
| Vehs Exited          | 1629 | 1582 | 1626 | 1647 | 1607 | 1580 | 1576 |
| Starting Vehs        | 188  | 179  | 215  | 202  | 175  | 168  | 208  |
| Ending Vehs          | 202  | 187  | 191  | 221  | 209  | 231  | 196  |
| Travel Distance (mi) | 1403 | 1393 | 1400 | 1444 | 1398 | 1396 | 1344 |
| Travel Time (hr)     | 55.5 | 54.4 | 55.2 | 56.1 | 53.6 | 56.4 | 52.4 |
| Total Delay (hr)     | 22.0 | 21.2 | 21.7 | 21.5 | 20.3 | 23.2 | 20.3 |
| Total Stops          | 1167 | 1100 | 1163 | 1141 | 1073 | 1241 | 1108 |
| Fuel Used (gal)      | 51.9 | 51.3 | 51.8 | 52.3 | 51.3 | 52.0 | 49.0 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1667 | 1591 | 1608 | 1621 |
| Vehs Exited          | 1648 | 1608 | 1594 | 1612 |
| Starting Vehs        | 172  | 207  | 187  | 190  |
| Ending Vehs          | 191  | 190  | 201  | 198  |
| Travel Distance (mi) | 1411 | 1381 | 1385 | 1395 |
| Travel Time (hr)     | 53.4 | 53.1 | 51.9 | 54.2 |
| Total Delay (hr)     | 19.7 | 20.1 | 19.0 | 20.9 |
| Total Stops          | 1059 | 1088 | 993  | 1109 |
| Fuel Used (gal)      | 51.5 | 50.4 | 49.9 | 51.2 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1498 | 1429 | 1371 | 1449 | 1399 | 1436 | 1396 |
| Vehs Exited          | 1498 | 1411 | 1372 | 1483 | 1422 | 1457 | 1418 |
| Starting Vehs        | 202  | 187  | 191  | 221  | 209  | 231  | 196  |
| Ending Vehs          | 202  | 205  | 190  | 187  | 186  | 210  | 174  |
| Travel Distance (mi) | 1292 | 1213 | 1164 | 1269 | 1230 | 1252 | 1222 |
| Travel Time (hr)     | 51.8 | 45.8 | 44.7 | 48.7 | 46.9 | 47.9 | 45.9 |
| Total Delay (hr)     | 20.8 | 16.8 | 16.8 | 18.2 | 17.4 | 17.9 | 16.8 |
| Total Stops          | 1128 | 977  | 941  | 1031 | 984  | 1016 | 924  |
| Fuel Used (gal)      | 47.9 | 43.9 | 42.2 | 46.1 | 44.5 | 45.6 | 44.6 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1393 | 1413 | 1404 | 1417 |
| Vehs Exited          | 1390 | 1421 | 1416 | 1429 |
| Starting Vehs        | 191  | 190  | 201  | 198  |
| Ending Vehs          | 194  | 182  | 189  | 191  |
| Travel Distance (mi) | 1218 | 1199 | 1220 | 1228 |
| Travel Time (hr)     | 44.3 | 44.4 | 46.8 | 46.7 |
| Total Delay (hr)     | 15.1 | 15.8 | 17.4 | 17.3 |
| Total Stops          | 892  | 895  | 945  | 974  |
| Fuel Used (gal)      | 43.6 | 43.1 | 44.6 | 44.6 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1475 | 1492 | 1451 | 1437 | 1431 | 1424 | 1479 |
| Vehs Exited          | 1478 | 1514 | 1481 | 1461 | 1445 | 1453 | 1482 |
| Starting Vehs        | 202  | 205  | 190  | 187  | 186  | 210  | 174  |
| Ending Vehs          | 199  | 183  | 160  | 163  | 172  | 181  | 171  |
| Travel Distance (mi) | 1264 | 1297 | 1267 | 1253 | 1245 | 1258 | 1280 |
| Travel Time (hr)     | 48.8 | 49.3 | 48.6 | 47.0 | 46.0 | 46.7 | 48.5 |
| Total Delay (hr)     | 18.5 | 18.3 | 18.3 | 17.3 | 16.3 | 16.7 | 18.1 |
| Total Stops          | 1027 | 998  | 1049 | 959  | 943  | 986  | 934  |
| Fuel Used (gal)      | 46.0 | 47.0 | 45.7 | 45.2 | 45.3 | 44.8 | 47.1 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1420 | 1405 | 1486 | 1448 |
| Vehs Exited          | 1438 | 1439 | 1487 | 1467 |
| Starting Vehs        | 194  | 182  | 189  | 191  |
| Ending Vehs          | 176  | 148  | 188  | 173  |
| Travel Distance (mi) | 1246 | 1220 | 1280 | 1261 |
| Travel Time (hr)     | 46.6 | 47.1 | 46.8 | 47.5 |
| Total Delay (hr)     | 17.0 | 18.0 | 16.4 | 17.5 |
| Total Stops          | 990  | 1005 | 916  | 981  |
| Fuel Used (gal)      | 44.6 | 44.6 | 46.2 | 45.6 |

Queuing and Blocking Report  
Baseline

2022 No Build - AM  
08/24/2020

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L  |
| Maximum Queue (ft)    | 86  | 70  | 229 | 237 | 210 | 33  | 219 | 401  | 466  | 464  | 61   | 54 |
| Average Queue (ft)    | 38  | 25  | 149 | 143 | 110 | 5   | 98  | 194  | 219  | 234  | 23   | 7  |
| 95th Queue (ft)       | 72  | 58  | 212 | 217 | 193 | 22  | 183 | 370  | 410  | 427  | 53   | 32 |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |    |
| Upstream Blk Time (%) |     |     | 1   | 1   | 0   |     |     |      |      |      |      |    |
| Queuing Penalty (veh) |     |     | 2   | 2   | 1   |     |     |      |      |      |      |    |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     | 0    |      |      |      | 0  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 0    |      |      |      | 0  |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 93  | 68  | 195  | 180  | 100 |
| Average Queue (ft)    | 34  | 27  | 115  | 93   | 40  |
| 95th Queue (ft)       | 75  | 55  | 179  | 166  | 76  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 2   |     | 0    |      |     |
| Queuing Penalty (veh) | 1   |     | 0    |      |     |

Intersection: 2: Commerce Pkwy

| Movement              |
|-----------------------|
| Directions Served     |
| Maximum Queue (ft)    |
| Average Queue (ft)    |
| 95th Queue (ft)       |
| Link Distance (ft)    |
| Upstream Blk Time (%) |
| Queuing Penalty (veh) |
| Storage Bay Dist (ft) |
| Storage Blk Time (%)  |
| Queuing Penalty (veh) |

Queuing and Blocking Report  
Baseline

2022 No Build - AM  
08/24/2020

Intersection: 3: Warrenton Road (US 17)

| Movement              | EB | EB | EB | WB  |
|-----------------------|----|----|----|-----|
| Directions Served     | T  | T  | T  | T   |
| Maximum Queue (ft)    | 19 | 17 | 4  | 8   |
| Average Queue (ft)    | 1  | 1  | 0  | 0   |
| 95th Queue (ft)       | 10 | 13 | 4  | 6   |
| Link Distance (ft)    | 75 | 75 | 75 | 208 |
| Upstream Blk Time (%) | 0  | 0  |    |     |
| Queuing Penalty (veh) | 0  | 0  |    |     |
| Storage Bay Dist (ft) |    |    |    |     |
| Storage Blk Time (%)  |    |    |    |     |
| Queuing Penalty (veh) |    |    |    |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB   | WB   | WB   | WB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|------|------|------|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | L   | T    | T    | T    | R   | LT  |
| Maximum Queue (ft)    | 138 | 358  | 382  | 357  | 40  | 13  | 42  | 323  | 296  | 263  | 16  | 5   |
| Average Queue (ft)    | 25  | 25   | 31   | 31   | 1   | 1   | 7   | 144  | 115  | 77   | 1   | 0   |
| 95th Queue (ft)       | 111 | 187  | 203  | 194  | 41  | 5   | 27  | 291  | 256  | 196  | 7   | 4   |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |     |     |     | 1184 | 1184 | 1184 |     | 680 |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |      |      |      |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |      |      |      |     |     |
| Storage Bay Dist (ft) | 375 |      |      |      | 350 | 520 | 520 |      |      |      | 235 |     |
| Storage Blk Time (%)  |     | 1    |      |      | 1   |     |     |      |      | 0    |     |     |
| Queuing Penalty (veh) |     | 0    |      |      | 0   |     |     |      |      | 0    |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | NB | SB  | SB  | SB |
|-----------------------|-----|----|-----|-----|----|
| Directions Served     | R   | R  | L   | LT  | R  |
| Maximum Queue (ft)    | 30  | 4  | 92  | 45  | 59 |
| Average Queue (ft)    | 7   | 0  | 33  | 5   | 20 |
| 95th Queue (ft)       | 25  | 3  | 75  | 24  | 47 |
| Link Distance (ft)    | 680 |    | 833 |     |    |
| Upstream Blk Time (%) |     |    |     |     |    |
| Queuing Penalty (veh) |     |    |     |     |    |
| Storage Bay Dist (ft) | 220 |    | 340 | 340 |    |
| Storage Blk Time (%)  |     |    |     |     |    |
| Queuing Penalty (veh) |     |    |     |     |    |

Queuing and Blocking Report  
Baseline

2022 No Build - AM  
08/24/2020

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 305 | 375  | 321  | 285  | 22   | 96  | 214 | 388 | 361 | 314 | 45  | 130 |
| Average Queue (ft)    | 154 | 225  | 193  | 134  | 3    | 34  | 68  | 195 | 150 | 106 | 7   | 48  |
| 95th Queue (ft)       | 272 | 343  | 307  | 250  | 16   | 77  | 147 | 328 | 292 | 243 | 26  | 97  |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 335 |      |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  | 0   | 1    |      |      |      |     |     | 1   |     |     |     | 0   |
| Queuing Penalty (veh) | 2   | 1    |      |      |      |     |     | 1   |     |     |     | 0   |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 71  | 144 | 131 | 142 |
| Average Queue (ft)    | 33  | 77  | 62  | 58  |
| 95th Queue (ft)       | 60  | 132 | 119 | 120 |
| Link Distance (ft)    |     | 464 | 464 |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 185 |     | 210 |     |
| Storage Blk Time (%)  |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |

Network Summary

Network wide Queuing Penalty: 11

## Lanes, Volumes, Timings

2022 No Build - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | ↑↑    | ↑↑↑↑  | ↑     | ↑     | ↑↑↑↑  | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑↑    | ↑     |
| Traffic Volume (vph)       | 148   | 1532  | 59    | 48    | 1575  | 232   | 30    | 35    | 138   | 238   | 21    | 134   |
| Future Volume (vph)        | 148   | 1532  | 59    | 48    | 1575  | 232   | 30    | 35    | 138   | 238   | 21    | 134   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |
| Storage Length (ft)        | 0     |       | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.996 |       | 0.950 | 0.960 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1771  | 1591  | 1664  | 1682  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.996 |       | 0.950 | 0.960 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1771  | 1591  | 1664  | 1682  | 1567  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |
| Satd. Flow (RTOR)          |       |       | 111   |       |       | 255   |       |       | 217   |       |       | 217   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 163   | 1684  | 65    | 53    | 1731  | 255   | 33    | 38    | 152   | 262   | 23    | 147   |
| Shared Lane Traffic (%)    |       |       |       |       |       | 10%   |       |       |       | 46%   |       |       |
| Lane Group Flow (vph)      | 163   | 1684  | 65    | 53    | 1731  | 255   | 30    | 41    | 152   | 141   | 144   | 147   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  |
| Total Split (s)            | 18.0  | 85.0  | 17.0  | 15.0  | 82.0  | 33.0  | 17.0  | 17.0  | 17.0  | 33.0  | 33.0  | 33.0  |
| Total Split (%)            | 12.0% | 56.7% | 11.3% | 10.0% | 54.7% | 22.0% | 11.3% | 11.3% | 11.3% | 22.0% | 22.0% | 22.0% |
| Maximum Green (s)          | 9.5   | 79.0  | 7.3   | 6.4   | 76.0  | 23.3  | 7.3   | 7.3   | 7.3   | 23.3  | 23.3  | 23.3  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

2022 No Build - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/24/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None  | None | C-Max | None  | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   |       |      |       | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 11.0  |       |      |       | 11.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |       |      |       | 0     |      |      |      |      |      |      |
| Act Effct Green (s)     | 14.0 | 88.0  | 103.9 | 12.4 | 83.4  | 110.6 | 12.0 | 12.0 | 12.0 | 23.3 | 23.3 | 23.3 |
| Actuated g/C Ratio      | 0.09 | 0.59  | 0.69  | 0.08 | 0.56  | 0.74  | 0.08 | 0.08 | 0.08 | 0.16 | 0.16 | 0.16 |
| v/c Ratio               | 0.51 | 0.63  | 0.06  | 0.37 | 0.68  | 0.21  | 0.22 | 0.29 | 0.47 | 0.55 | 0.55 | 0.35 |
| Control Delay           | 55.5 | 10.2  | 0.1   | 56.0 | 30.4  | 0.9   | 68.8 | 70.5 | 5.7  | 65.9 | 66.1 | 2.6  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 55.5 | 10.2  | 0.1   | 56.0 | 30.4  | 0.9   | 68.8 | 70.5 | 5.7  | 65.9 | 66.1 | 2.6  |
| LOS                     | E    | B     | A     | E    | C     | A     | E    | E    | A    | E    | E    | A    |
| Approach Delay          |      | 13.7  |       |      | 27.4  |       |      | 26.1 |      |      | 44.4 |      |
| Approach LOS            |      | B     |       |      | C     |       |      | C    |      |      | D    |      |

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 49 (33%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 23.2

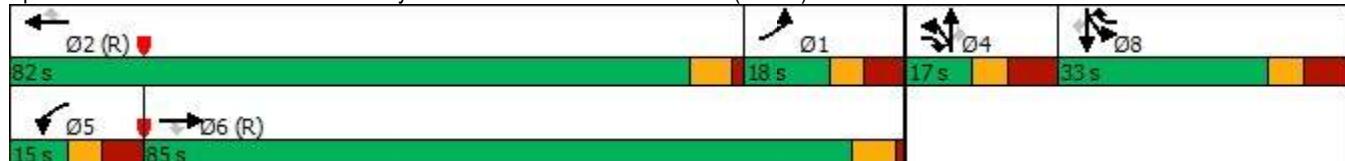
Intersection LOS: C

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



HCM 6th Signalized Intersection Summary  
1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

2022 No Build - PM

08/24/2020

| Movement   | EBL   | EBT  | EBR  | WBL  | WBT   | WBR   | NBL  | NBT  | NBR   | SBL  | SBT  | SBR  |
|--|-------|------|------|------|-------|-------|------|------|-------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑    | ↑↑↑↑  | ↑     | ↑↑   | ↑    | ↑     | ↑    | ↑↑   | ↑    |
| Traffic Volume (veh/h)   | 148   | 1532 | 59   | 48   | 1575  | 232   | 30   | 35   | 138   | 238  | 21   | 134  |
| Future Volume (veh/h)  | 148   | 1532 | 59   | 48   | 1575  | 232   | 30   | 35   | 138   | 238  | 21   | 134  |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0     | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |      | 1.00  | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |      |       | No    |      |      | No    |      | No   |      |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864 | 1701  | 1864  | 1909 | 1909 | 1909  | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 163   | 1684 | 65   | 53   | 1731  | 255   | 33   | 38   | 152   | 278  | 0    | 147  |
| Peak Hour Factor   | 0.91  | 0.91 | 0.91 | 0.91 | 0.91  | 0.91  | 0.91 | 0.91 | 0.91  | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2    | 13    | 2     | 2    | 2    | 2     | 2    | 2    | 2    |
| Cap, veh/h   | 482   | 2679 | 1073 | 121  | 2415  | 1078  | 149  | 157  | 133   | 501  | 0    | 223  |
| Arrive On Green  | 0.14  | 0.57 | 0.59 | 0.07 | 0.52  | 0.54  | 0.08 | 0.08 | 0.08  | 0.14 | 0.00 | 0.14 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776 | 4645  | 1580  | 1818 | 1909 | 1618  | 3518 | 0    | 1565 |
| Grp Volume(v), veh/h   | 163   | 1684 | 65   | 53   | 1731  | 255   | 33   | 38   | 152   | 278  | 0    | 147  |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776 | 1548  | 1580  | 1818 | 1909 | 1618  | 1759 | 0    | 1565 |
| Q Serve(g_s), s  | 6.4   | 36.1 | 2.1  | 4.3  | 42.8  | 9.2   | 2.5  | 2.8  | 12.3  | 11.0 | 0.0  | 13.3 |
| Cycle Q Clear(g_c), s  | 6.4   | 36.1 | 2.1  | 4.3  | 42.8  | 9.2   | 2.5  | 2.8  | 12.3  | 11.0 | 0.0  | 13.3 |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |      | 1.00  | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 482   | 2679 | 1073 | 121  | 2415  | 1078  | 149  | 157  | 133   | 501  | 0    | 223  |
| V/C Ratio(X)   | 0.34  | 0.63 | 0.06 | 0.44 | 0.72  | 0.24  | 0.22 | 0.24 | 1.15  | 0.55 | 0.00 | 0.66 |
| Avail Cap(c_a), veh/h  | 482   | 2679 | 1073 | 130  | 2415  | 1078  | 149  | 157  | 133   | 664  | 0    | 295  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.71 | 0.71  | 0.71  | 1.00 | 1.00 | 1.00  | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh   | 58.3  | 21.2 | 8.2  | 67.1 | 27.5  | 9.0   | 64.4 | 64.5 | 68.8  | 59.9 | 0.0  | 60.9 |
| Incr Delay (d2), s/veh   | 0.4   | 1.1  | 0.1  | 1.8  | 1.3   | 0.4   | 0.7  | 0.8  | 122.6 | 1.0  | 0.0  | 3.3  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 2.8   | 12.7 | 0.9  | 2.0  | 15.4  | 4.8   | 1.2  | 1.4  | 9.6   | 5.0  | 0.0  | 5.5  |
| Unsig. Movement Delay, s/veh   |       |      |      |      |       |       |      |      |       |      |      |      |
| LnGrp Delay(d), s/veh  | 58.7  | 22.4 | 8.3  | 68.9 | 28.9  | 9.4   | 65.1 | 65.3 | 191.4 | 60.8 | 0.0  | 64.2 |
| LnGrp LOS  | E     | C    | A    | E    | C     | A     | E    | E    | F     | E    | A    | E    |
| Approach Vol, veh/h  | 1912  |      |      |      | 2039  |       |      |      | 223   |      |      | 425  |
| Approach Delay, s/veh  | 25.0  |      |      |      | 27.5  |       |      |      | 151.2 |      |      | 62.0 |
| Approach LOS   | C     |      |      |      | C     |       |      |      | F     |      |      | E    |
| Timer - Assigned Phs   | 1     | 2    |      | 4    | 5     | 6     |      |      | 8     |      |      |      |
| Phs Duration (G+Y+Rc), s   | 24.9  | 82.0 |      | 17.0 | 14.2  | 92.7  |      |      | 26.1  |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | 9.7  | * 8.6 | * 8.5 |      |      | 9.7   |      |      |      |
| Max Green Setting (Gmax), s  | * 9.5 | 76.0 |      | 7.3  | * 6.4 | * 79  |      |      | 23.3  |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 8.4   | 44.8 |      | 14.3 | 6.3   | 38.1  |      |      | 15.3  |      |      |      |
| Green Ext Time (p_c), s  | 0.1   | 30.6 |      | 0.0  | 0.0   | 39.9  |      |      | 1.0   |      |      |      |
| Intersection Summary   |       |      |      |      |       |       |      |      |       |      |      |      |
| HCM 6th Ctrl Delay   |       |      |      | 35.6 |       |       |      |      |       |      |      |      |
| HCM 6th LOS  |       |      |      | D    |       |       |      |      |       |      |      |      |
| Notes  |       |      |      |      |       |       |      |      |       |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |      |       |       |      |      |       |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |      |       |       |      |      |       |      |      |      |

### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5910  | 5900  | 5902  | 5896  | 5865  | 5908  | 5755  |
| Vehs Exited             | 5909  | 5904  | 5948  | 5899  | 5863  | 5903  | 5751  |
| Starting Vehs           | 203   | 203   | 223   | 217   | 213   | 202   | 185   |
| Ending Vehs             | 204   | 199   | 177   | 214   | 215   | 207   | 189   |
| Travel Distance (mi)    | 4967  | 4927  | 4980  | 4885  | 4878  | 4968  | 4801  |
| Travel Time (hr)        | 210.5 | 205.3 | 210.9 | 205.4 | 206.4 | 207.8 | 199.7 |
| Total Delay (hr)        | 87.9  | 83.8  | 88.2  | 85.1  | 85.7  | 85.9  | 81.4  |
| Total Stops             | 5263  | 5153  | 5330  | 5296  | 5174  | 5249  | 5118  |
| Fuel Used (gal)         | 191.0 | 187.7 | 190.8 | 188.6 | 186.6 | 190.0 | 184.0 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 5899  | 5864  | 5933  | 5881  |
| Vehs Exited             | 5898  | 5876  | 5927  | 5888  |
| Starting Vehs           | 198   | 204   | 185   | 200   |
| Ending Vehs             | 199   | 192   | 191   | 200   |
| Travel Distance (mi)    | 4932  | 4896  | 4963  | 4920  |
| Travel Time (hr)        | 205.3 | 206.2 | 208.3 | 206.6 |
| Total Delay (hr)        | 83.9  | 85.6  | 85.8  | 85.3  |
| Total Stops             | 5247  | 5197  | 5224  | 5224  |
| Fuel Used (gal)         | 188.4 | 187.8 | 188.9 | 188.4 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 4:45 |
| End Time                            | 5:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

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**Interval #1 Information Int 1**

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Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1414 | 1481 | 1473 | 1402 | 1400 | 1339 | 1334 |
| Vehs Exited          | 1428 | 1470 | 1482 | 1441 | 1404 | 1379 | 1337 |
| Starting Vehs        | 203  | 203  | 223  | 217  | 213  | 202  | 185  |
| Ending Vehs          | 189  | 214  | 214  | 178  | 209  | 162  | 182  |
| Travel Distance (mi) | 1181 | 1240 | 1245 | 1178 | 1143 | 1166 | 1108 |
| Travel Time (hr)     | 48.5 | 51.9 | 52.9 | 49.9 | 48.8 | 46.6 | 45.6 |
| Total Delay (hr)     | 19.2 | 21.4 | 22.3 | 20.9 | 20.4 | 17.9 | 18.5 |
| Total Stops          | 1202 | 1289 | 1346 | 1307 | 1234 | 1152 | 1218 |
| Fuel Used (gal)      | 44.8 | 47.0 | 48.5 | 46.2 | 44.2 | 43.2 | 42.1 |

**Interval #1 Information Int 1**

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Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1474 | 1437 | 1470 | 1422 |
| Vehs Exited          | 1483 | 1449 | 1454 | 1432 |
| Starting Vehs        | 198  | 204  | 185  | 200  |
| Ending Vehs          | 189  | 192  | 201  | 193  |
| Travel Distance (mi) | 1229 | 1209 | 1228 | 1193 |
| Travel Time (hr)     | 52.0 | 50.5 | 51.1 | 49.8 |
| Total Delay (hr)     | 21.7 | 20.8 | 20.7 | 20.4 |
| Total Stops          | 1347 | 1275 | 1272 | 1266 |
| Fuel Used (gal)      | 47.6 | 46.8 | 46.3 | 45.7 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1667 | 1553 | 1549 | 1598 | 1524 | 1663 | 1533 |
| Vehs Exited          | 1608 | 1557 | 1563 | 1522 | 1501 | 1588 | 1513 |
| Starting Vehs        | 189  | 214  | 214  | 178  | 209  | 162  | 182  |
| Ending Vehs          | 248  | 210  | 200  | 254  | 232  | 237  | 202  |
| Travel Distance (mi) | 1393 | 1304 | 1299 | 1286 | 1277 | 1348 | 1275 |
| Travel Time (hr)     | 61.1 | 55.0 | 55.0 | 54.7 | 53.3 | 58.4 | 53.6 |
| Total Delay (hr)     | 26.8 | 22.9 | 23.1 | 22.8 | 21.7 | 25.2 | 22.4 |
| Total Stops          | 1553 | 1405 | 1420 | 1386 | 1327 | 1448 | 1341 |
| Fuel Used (gal)      | 54.5 | 50.0 | 49.9 | 49.2 | 48.2 | 52.4 | 49.6 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1592 | 1574 | 1578 | 1583 |
| Vehs Exited          | 1577 | 1554 | 1564 | 1554 |
| Starting Vehs        | 189  | 192  | 201  | 193  |
| Ending Vehs          | 204  | 212  | 215  | 218  |
| Travel Distance (mi) | 1340 | 1279 | 1322 | 1312 |
| Travel Time (hr)     | 56.6 | 55.5 | 57.7 | 56.1 |
| Total Delay (hr)     | 23.6 | 24.0 | 25.1 | 23.8 |
| Total Stops          | 1462 | 1405 | 1458 | 1417 |
| Fuel Used (gal)      | 51.4 | 49.5 | 51.5 | 50.6 |

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**Interval #3 Information Int 3**

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Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1411 | 1426 | 1416 | 1476 | 1427 | 1443 | 1436 |
| Vehs Exited          | 1454 | 1426 | 1440 | 1557 | 1463 | 1481 | 1440 |
| Starting Vehs        | 248  | 210  | 200  | 254  | 232  | 237  | 202  |
| Ending Vehs          | 205  | 210  | 176  | 173  | 196  | 199  | 198  |
| Travel Distance (mi) | 1201 | 1188 | 1207 | 1280 | 1218 | 1239 | 1204 |
| Travel Time (hr)     | 50.7 | 48.2 | 50.2 | 53.4 | 50.6 | 51.9 | 49.6 |
| Total Delay (hr)     | 21.1 | 18.9 | 20.3 | 22.1 | 20.7 | 21.6 | 19.8 |
| Total Stops          | 1268 | 1215 | 1229 | 1359 | 1258 | 1311 | 1249 |
| Fuel Used (gal)      | 46.2 | 44.9 | 45.3 | 49.5 | 46.5 | 47.5 | 45.8 |

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**Interval #3 Information Int 3**

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Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1391 | 1394 | 1401 | 1422 |
| Vehs Exited          | 1385 | 1434 | 1439 | 1452 |
| Starting Vehs        | 204  | 212  | 215  | 218  |
| Ending Vehs          | 210  | 172  | 177  | 188  |
| Travel Distance (mi) | 1143 | 1193 | 1199 | 1207 |
| Travel Time (hr)     | 45.7 | 49.9 | 47.8 | 49.8 |
| Total Delay (hr)     | 17.6 | 20.6 | 18.5 | 20.1 |
| Total Stops          | 1195 | 1258 | 1157 | 1248 |
| Fuel Used (gal)      | 43.1 | 45.4 | 44.6 | 45.9 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1418 | 1440 | 1464 | 1420 | 1514 | 1463 | 1452 |
| Vehs Exited          | 1419 | 1451 | 1463 | 1379 | 1495 | 1455 | 1461 |
| Starting Vehs        | 205  | 210  | 176  | 173  | 196  | 199  | 198  |
| Ending Vehs          | 204  | 199  | 177  | 214  | 215  | 207  | 189  |
| Travel Distance (mi) | 1193 | 1196 | 1229 | 1141 | 1239 | 1214 | 1214 |
| Travel Time (hr)     | 50.2 | 50.3 | 52.9 | 47.4 | 53.7 | 50.9 | 50.9 |
| Total Delay (hr)     | 20.8 | 20.6 | 22.6 | 19.2 | 22.7 | 21.2 | 20.7 |
| Total Stops          | 1240 | 1244 | 1335 | 1244 | 1355 | 1338 | 1310 |
| Fuel Used (gal)      | 45.5 | 45.7 | 47.1 | 43.8 | 47.7 | 46.9 | 46.5 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1442 | 1459 | 1484 | 1456 |
| Vehs Exited          | 1453 | 1439 | 1470 | 1449 |
| Starting Vehs        | 210  | 172  | 177  | 188  |
| Ending Vehs          | 199  | 192  | 191  | 200  |
| Travel Distance (mi) | 1219 | 1215 | 1213 | 1207 |
| Travel Time (hr)     | 51.0 | 50.3 | 51.6 | 50.9 |
| Total Delay (hr)     | 20.9 | 20.2 | 21.5 | 21.0 |
| Total Stops          | 1243 | 1259 | 1337 | 1292 |
| Fuel Used (gal)      | 46.3 | 46.1 | 46.4 | 46.2 |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L  |
| Maximum Queue (ft)    | 146 | 131 | 204 | 207 | 200 | 41  | 124 | 415  | 459  | 477  | 82   | 95 |
| Average Queue (ft)    | 69  | 56  | 135 | 119 | 104 | 5   | 50  | 237  | 270  | 285  | 31   | 9  |
| 95th Queue (ft)       | 120 | 103 | 192 | 195 | 188 | 25  | 104 | 379  | 422  | 435  | 66   | 43 |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |    |
| Upstream Blk Time (%) | 0   | 0   | 0   | 0   |     |     |     |      |      |      |      |    |
| Queuing Penalty (veh) | 0   | 0   | 1   | 1   |     |     |     |      |      |      |      |    |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     | 0    |      |      |      | 0  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 0    |      |      |      | 0  |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 120 | 124 | 208  | 204  | 121 |
| Average Queue (ft)    | 51  | 53  | 134  | 112  | 50  |
| 95th Queue (ft)       | 106 | 101 | 198  | 189  | 98  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 7   |     | 0    |      |     |
| Queuing Penalty (veh) | 11  |     | 0    |      |     |

Intersection: 2: Commerce Pkwy

| Movement              |
|-----------------------|
| Directions Served     |
| Maximum Queue (ft)    |
| Average Queue (ft)    |
| 95th Queue (ft)       |
| Link Distance (ft)    |
| Upstream Blk Time (%) |
| Queuing Penalty (veh) |
| Storage Bay Dist (ft) |
| Storage Blk Time (%)  |
| Queuing Penalty (veh) |

Queuing and Blocking Report  
Baseline

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Intersection: 3: Warrenton Road (US 17)

| Movement              | EB | EB | EB | WB  |
|-----------------------|----|----|----|-----|
| Directions Served     | T  | T  | T  | T   |
| Maximum Queue (ft)    | 6  | 2  | 3  | 4   |
| Average Queue (ft)    | 0  | 0  | 0  | 0   |
| 95th Queue (ft)       | 4  | 2  | 3  | 4   |
| Link Distance (ft)    | 75 | 75 | 75 | 208 |
| Upstream Blk Time (%) |    |    |    |     |
| Queuing Penalty (veh) |    |    |    |     |
| Storage Bay Dist (ft) |    |    |    |     |
| Storage Blk Time (%)  |    |    |    |     |
| Queuing Penalty (veh) |    |    |    |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB | WB  | WB  | WB   | WB   | WB   | WB  | NB  |
|-----------------------|-----|------|------|------|----|-----|-----|------|------|------|-----|-----|
| Directions Served     | L   | T    | T    | T    | R  | L   | L   | T    | T    | T    | R   | LT  |
| Maximum Queue (ft)    | 121 | 199  | 206  | 221  | 1  | 50  | 139 | 423  | 377  | 349  | 89  | 129 |
| Average Queue (ft)    | 52  | 86   | 103  | 107  | 0  | 6   | 35  | 241  | 201  | 158  | 3   | 56  |
| 95th Queue (ft)       | 109 | 169  | 183  | 190  | 0  | 30  | 104 | 369  | 335  | 297  | 51  | 109 |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |    |     |     | 1184 | 1184 | 1184 |     | 680 |
| Upstream Blk Time (%) |     |      |      |      |    |     |     |      |      |      |     |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      |     |     |
| Storage Bay Dist (ft) |     | 375  |      |      |    | 350 | 520 | 520  |      |      | 235 |     |
| Storage Blk Time (%)  |     |      |      |      |    |     |     |      | 0    |      | 2   |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      | 0    |      | 1   |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | R   | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 160 | 120 | 163 | 146 | 77  |
| Average Queue (ft)    | 63  | 13  | 86  | 37  | 30  |
| 95th Queue (ft)       | 118 | 59  | 148 | 111 | 60  |
| Link Distance (ft)    | 680 |     | 833 |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 220 |     | 340 | 340 |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

Queuing and Blocking Report  
Baseline

2022 No Build - PM  
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Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 352 | 419  | 388  | 306  | 34   | 77  | 122 | 340 | 273 | 215 | 30  | 270 |
| Average Queue (ft)    | 173 | 253  | 228  | 166  | 8    | 19  | 46  | 170 | 125 | 84  | 6   | 118 |
| 95th Queue (ft)       | 282 | 376  | 349  | 286  | 27   | 55  | 96  | 294 | 232 | 173 | 19  | 224 |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 335 |      |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  | 0   | 1    |      |      |      |     |     | 0   |     |     |     | 4   |
| Queuing Penalty (veh) | 0   | 3    |      |      |      |     |     | 0   |     |     |     | 7   |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 198 | 124 | 103 | 144 |
| Average Queue (ft)    | 76  | 63  | 47  | 56  |
| 95th Queue (ft)       | 162 | 113 | 98  | 115 |
| Link Distance (ft)    |     | 464 | 464 |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 185 |     | 210 |     |
| Storage Blk Time (%)  | 1   |     |     |     |
| Queuing Penalty (veh) | 1   |     |     |     |

Network Summary

Network wide Queuing Penalty: 26



## **Appendix F**

### **Build (2022) Capacity Analysis**

## Lanes, Volumes, Timings

1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | ↑↑    | ↑↑↑↑  | ↑     | ↑     | ↑↑↑↑  | ↑     | ↑↑    | ↑↑    | ↑↑    | ↑↑    | ↑↑    | ↑↑    |
| Traffic Volume (vph)       | 76    | 1410  | 33    | 133   | 2205  | 150   | 78    | 36    | 230   | 165   | 59    | 85    |
| Future Volume (vph)        | 76    | 1410  | 33    | 133   | 2205  | 150   | 78    | 36    | 230   | 165   | 59    | 85    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |
| Storage Length (ft)        | 0     |       | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.981 |       | 0.950 | 0.977 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1745  | 1591  | 1664  | 1712  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.981 |       | 0.950 | 0.977 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1745  | 1591  | 1664  | 1712  | 1567  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |
| Satd. Flow (RTOR)          |       |       | 121   |       |       | 160   |       |       | 234   |       |       | 232   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 81    | 1500  | 35    | 141   | 2346  | 160   | 83    | 38    | 245   | 176   | 63    | 90    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       | 28%   |       |       | 33%   |       |       |
| Lane Group Flow (vph)      | 81    | 1500  | 35    | 141   | 2346  | 160   | 60    | 61    | 245   | 118   | 121   | 90    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     |       | 4     | 4     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 8     |       |       | 4     |
| Detector Phase             | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     | 8     | 4     | 4     | 4     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.9  | 14.7  | 14.7  | 14.7  | 14.9  | 14.9  | 14.9  |
| Total Split (s)            | 16.0  | 79.0  | 18.0  | 23.0  | 86.0  | 20.0  | 18.0  | 18.0  | 18.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 11.4% | 56.4% | 12.9% | 16.4% | 61.4% | 14.3% | 12.9% | 12.9% | 12.9% | 14.3% | 14.3% | 14.3% |
| Maximum Green (s)          | 7.5   | 73.0  | 8.3   | 14.4  | 80.0  | 10.1  | 8.3   | 8.3   | 8.3   | 10.1  | 10.1  | 10.1  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.8   | 5.6   | 5.6   | 5.6   | 5.8   | 5.8   | 5.8   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.9   | 4.7   | 4.7   | 4.7   | 4.9   | 4.9   | 4.9   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020



| Lane Group              | EBL  | EBT   | EBR  | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|------|------|-------|------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None | None | C-Max | None |
| Walk Time (s)           |      | 7.0   |      |      |       | 7.0  |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 28.0  |      |      |       | 30.0 |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |      |      |       | 0    |      |      |      |      |      |      |
| Act Effect Green (s)    | 12.0 | 76.3  | 88.5 | 18.1 | 82.5  | 96.6 | 12.9 | 12.9 | 12.9 | 15.0 | 15.0 | 15.0 |
| Actuated g/C Ratio      | 0.09 | 0.54  | 0.63 | 0.13 | 0.59  | 0.69 | 0.09 | 0.09 | 0.09 | 0.11 | 0.11 | 0.11 |
| v/c Ratio               | 0.28 | 0.60  | 0.03 | 0.62 | 0.87  | 0.14 | 0.39 | 0.38 | 0.68 | 0.66 | 0.66 | 0.24 |
| Control Delay           | 49.2 | 10.1  | 0.1  | 67.8 | 19.1  | 0.8  | 67.3 | 66.9 | 19.0 | 78.4 | 77.9 | 1.5  |
| Queue Delay             | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 49.2 | 10.1  | 0.1  | 67.8 | 19.1  | 0.8  | 67.3 | 66.9 | 19.0 | 78.4 | 77.9 | 1.5  |
| LOS                     | D    | B     | A    | E    | B     | A    | E    | E    | B    | E    | E    | A    |
| Approach Delay          |      | 11.9  |      |      |       | 20.6 |      |      | 34.9 |      |      | 57.2 |
| Approach LOS            |      | B     |      |      |       | C    |      |      | C    |      |      | E    |

## Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 120 (86%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 21.2

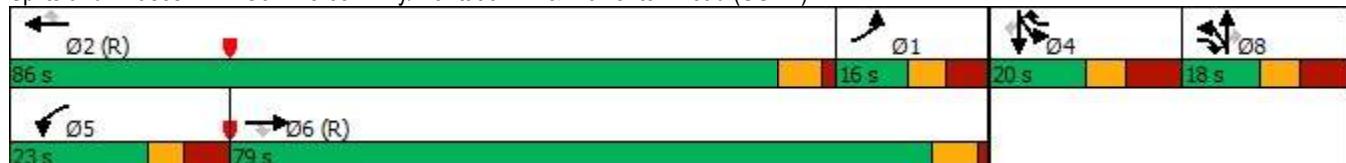
Intersection LOS: C

Intersection Capacity Utilization 70.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



## HCM 6th Signalized Intersection Summary

1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

## HCM 6th Signalized Intersection Summary

08/31/2020

| Movement   | EBL   | EBT  | EBR  | WBL   | WBT   | WBR   | NBL  | NBT  | NBR   | SBL  | SBT  | SBR  |
|--|-------|------|------|-------|-------|-------|------|------|-------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑     | ↑↑↑↑  | ↑     | ↑↑   | ↑    | ↑     | ↑    | ↑↑   | ↑    |
| Traffic Volume (veh/h)   | 76    | 1410 | 33   | 133   | 2205  | 150   | 78   | 36   | 230   | 165  | 59   | 85   |
| Future Volume (veh/h)  | 76    | 1410 | 33   | 133   | 2205  | 150   | 78   | 36   | 230   | 165  | 59   | 85   |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0     | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00  | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |       | No    |       | No   |      | No    | No   |      | No   |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864  | 1701  | 1864  | 1909 | 1909 | 1909  | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 81    | 1500 | 35   | 141   | 2346  | 160   | 60   | 69   | 245   | 120  | 142  | 90   |
| Peak Hour Factor   | 0.94  | 0.94 | 0.94 | 0.94  | 0.94  | 0.94  | 0.94 | 0.94 | 0.94  | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2     | 13    | 2     | 2    | 2    | 2     | 2    | 2    | 2    |
| Cap, veh/h   | 878   | 3259 | 1293 | 218   | 2721  | 1130  | 173  | 181  | 154   | 190  | 199  | 169  |
| Arrive On Green  | 0.25  | 0.70 | 0.72 | 0.12  | 0.59  | 0.61  | 0.09 | 0.09 | 0.09  | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776  | 4645  | 1580  | 1818 | 1909 | 1618  | 1759 | 1847 | 1565 |
| Grp Volume(v), veh/h   | 81    | 1500 | 35   | 141   | 2346  | 160   | 60   | 69   | 245   | 120  | 142  | 90   |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776  | 1548  | 1580  | 1818 | 1909 | 1618  | 1759 | 1847 | 1565 |
| Q Serve(g_s), s  | 2.5   | 20.0 | 0.6  | 10.6  | 59.2  | 4.5   | 4.3  | 4.8  | 13.3  | 9.1  | 10.4 | 7.6  |
| Cycle Q Clear(g_c), s  | 2.5   | 20.0 | 0.6  | 10.6  | 59.2  | 4.5   | 4.3  | 4.8  | 13.3  | 9.1  | 10.4 | 7.6  |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00  | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 878   | 3259 | 1293 | 218   | 2721  | 1130  | 173  | 181  | 154   | 190  | 199  | 169  |
| V/C Ratio(X)   | 0.09  | 0.46 | 0.03 | 0.65  | 0.86  | 0.14  | 0.35 | 0.38 | 1.59  | 0.63 | 0.71 | 0.53 |
| Avail Cap(c_a), veh/h  | 878   | 3259 | 1293 | 241   | 2721  | 1130  | 173  | 181  | 154   | 190  | 199  | 169  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.60  | 0.60  | 0.60  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh   | 39.9  | 9.3  | 2.4  | 58.5  | 24.3  | 6.3   | 59.3 | 59.5 | 63.3  | 59.8 | 60.4 | 59.1 |
| Incr Delay (d2), s/veh   | 0.0   | 0.5  | 0.0  | 3.1   | 2.4   | 0.2   | 1.2  | 1.3  | 295.6 | 6.7  | 11.3 | 3.2  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 1.1   | 6.2  | 0.3  | 4.9   | 20.4  | 2.1   | 2.0  | 2.4  | 18.1  | 4.4  | 5.5  | 3.2  |
| Unsig. Movement Delay, s/veh   |       |      |      |       |       |       |      |      |       |      |      |      |
| LnGrp Delay(d), s/veh  | 39.9  | 9.8  | 2.5  | 61.6  | 26.7  | 6.5   | 60.5 | 60.8 | 359.0 | 66.5 | 71.7 | 62.3 |
| LnGrp LOS  | D     | A    | A    | E     | C     | A     | E    | E    | F     | E    | E    | E    |
| Approach Vol, veh/h  | 1616  |      |      |       | 2647  |       |      |      | 374   |      |      | 352  |
| Approach Delay, s/veh  | 11.2  |      |      |       | 27.3  |       |      |      | 256.1 |      |      | 67.5 |
| Approach LOS   | B     |      |      |       | C     |       |      |      | F     |      |      | E    |
| Timer - Assigned Phs   | 1     | 2    |      | 4     | 5     | 6     |      |      | 8     |      |      |      |
| Phs Duration (G+Y+Rc), s   | 40.3  | 86.0 |      | 20.0  | 21.2  | 105.1 |      |      | 18.0  |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | * 9.9 | * 8.6 | * 8.5 |      |      | 9.7   |      |      |      |
| Max Green Setting (Gmax), s  | * 7.5 | 80.0 |      | * 10  | * 14  | * 73  |      |      | 8.3   |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 4.5   | 61.2 |      | 12.4  | 12.6  | 22.0  |      |      | 15.3  |      |      |      |
| Green Ext Time (p_c), s  | 0.0   | 18.8 |      | 0.0   | 0.1   | 48.1  |      |      | 0.0   |      |      |      |
| <b>Intersection Summary</b>  |       |      |      |       |       |       |      |      |       |      |      |      |
| HCM 6th Ctrl Delay   |       |      |      | 42.1  |       |       |      |      |       |      |      |      |
| HCM 6th LOS  |       |      |      | D     |       |       |      |      |       |      |      |      |
| <b>Notes</b>   |       |      |      |       |       |       |      |      |       |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |       |       |       |      |      |       |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |       |       |       |      |      |       |      |      |      |

Lanes, Volumes, Timings  
2: Commerce Pkwy & Driveway 2

Lanes, Volumes, Timings  
08/31/2020



| Lane Group                 | EBL   | EBR   | NBL  | NBT   | SBT   | SBR   |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations        |       |       |      |       |       |       |
| Traffic Volume (vph)       | 234   | 1     | 10   | 110   | 156   | 69    |
| Future Volume (vph)        | 234   | 1     | 10   | 110   | 156   | 69    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |      | -1%   | 0%    |       |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Frt                        | 0.999 |       |      |       | 0.959 |       |
| Flt Protected              | 0.953 |       |      | 0.996 |       |       |
| Satd. Flow (prot)          | 1773  | 0     | 0    | 1865  | 1786  | 0     |
| Flt Permitted              | 0.953 |       |      | 0.996 |       |       |
| Satd. Flow (perm)          | 1773  | 0     | 0    | 1865  | 1786  | 0     |
| Link Speed (mph)           | 30    |       |      | 35    | 35    |       |
| Link Distance (ft)         | 191   |       |      | 948   | 318   |       |
| Travel Time (s)            | 4.3   |       |      | 18.5  | 6.2   |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)            | 254   | 1     | 11   | 120   | 170   | 75    |
| Shared Lane Traffic (%)    |       |       |      |       |       |       |
| Lane Group Flow (vph)      | 255   | 0     | 0    | 131   | 245   | 0     |
| Enter Blocked Intersection | No    | No    | No   | No    | No    | No    |
| Lane Alignment             | Left  | Right | Left | Left  | Left  | Right |
| Median Width(ft)           | 12    |       |      | 12    | 12    |       |
| Link Offset(ft)            | 0     |       |      | 0     | 0     |       |
| Crosswalk Width(ft)        | 16    |       |      | 16    | 16    |       |
| Two way Left Turn Lane     |       |       |      | Yes   |       |       |
| Headway Factor             | 1.00  | 1.00  | 0.99 | 0.99  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15    | 9     | 15   |       |       | 9     |
| Sign Control               | Stop  |       |      | Free  | Free  |       |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 33.8% ICU Level of Service A

Analysis Period (min) 15

| Intersection             |        |        |       |        |      |      |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh         | 5.9    |        |       |        |      |      |
| Movement                 | EBL    | EBR    | NBL   | NBT    | SBT  | SBR  |
| Lane Configurations      |        |        |       |        |      |      |
| Traffic Vol, veh/h       | 234    | 1      | 10    | 110    | 156  | 69   |
| Future Vol, veh/h        | 234    | 1      | 10    | 110    | 156  | 69   |
| Conflicting Peds, #/hr   | 0      | 0      | 0     | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop   | Free  | Free   | Free | Free |
| RT Channelized           | -      | None   | -     | None   | -    | None |
| Storage Length           | 0      | -      | -     | -      | -    | -    |
| Veh in Median Storage, # | 0      | -      | -     | 0      | 0    | -    |
| Grade, %                 | 0      | -      | -     | -1     | 0    | -    |
| Peak Hour Factor         | 92     | 92     | 92    | 92     | 92   | 92   |
| Heavy Vehicles, %        | 2      | 2      | 2     | 2      | 2    | 2    |
| Mvmt Flow                | 254    | 1      | 11    | 120    | 170  | 75   |
| Major/Minor              |        |        |       |        |      |      |
| Major/Minor              | Minor2 | Major1 |       | Major2 |      |      |
| Conflicting Flow All     | 350    | 208    | 245   | 0      | -    | 0    |
| Stage 1                  | 208    | -      | -     | -      | -    | -    |
| Stage 2                  | 142    | -      | -     | -      | -    | -    |
| Critical Hdwy            | 6.42   | 6.22   | 4.12  | -      | -    | -    |
| Critical Hdwy Stg 1      | 5.42   | -      | -     | -      | -    | -    |
| Critical Hdwy Stg 2      | 5.42   | -      | -     | -      | -    | -    |
| Follow-up Hdwy           | 3.518  | 3.318  | 2.218 | -      | -    | -    |
| Pot Cap-1 Maneuver       | 647    | 832    | 1321  | -      | -    | -    |
| Stage 1                  | 827    | -      | -     | -      | -    | -    |
| Stage 2                  | 885    | -      | -     | -      | -    | -    |
| Platoon blocked, %       | -      | -      | -     | -      | -    | -    |
| Mov Cap-1 Maneuver       | 641    | 832    | 1321  | -      | -    | -    |
| Mov Cap-2 Maneuver       | 641    | -      | -     | -      | -    | -    |
| Stage 1                  | 820    | -      | -     | -      | -    | -    |
| Stage 2                  | 885    | -      | -     | -      | -    | -    |
| Approach                 |        |        |       |        |      |      |
| Approach                 | EB     | NB     |       | SB     |      |      |
| HCM Control Delay, s     | 14.3   | 0.6    |       | 0      |      |      |
| HCM LOS                  | B      |        |       |        |      |      |
| Minor Lane/Major Mvmt    |        | NBL    | NBT   | EBLn1  | SBT  | SBR  |
| Capacity (veh/h)         | 1321   | -      | 642   | -      | -    | -    |
| HCM Lane V/C Ratio       | 0.008  | -      | 0.398 | -      | -    | -    |
| HCM Control Delay (s)    | 7.7    | -      | 14.3  | -      | -    | -    |
| HCM Lane LOS             | A      | -      | B     | -      | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 1.9   | -      | -    | -    |

## Lanes, Volumes, Timings

3: Driveway 1 &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020



| Lane Group                 | EBT   | EBR   | WBL  | WBT  | NBL  | NBR   |
|----------------------------|-------|-------|------|------|------|-------|
| Lane Configurations        | 6     | 1     | 1    | 3    | 1    | 1     |
| Traffic Volume (vph)       | 1519  | 156   | 0    | 2368 | 0    | 0     |
| Future Volume (vph)        | 1519  | 156   | 0    | 2368 | 0    | 0     |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900 | 1900 | 1900  |
| Grade (%)                  | 0%    |       |      | 2%   | 0%   |       |
| Lane Util. Factor          | 0.76  | 0.76  | 1.00 | 0.86 | 1.00 | 1.00  |
| Frt                        | 0.986 |       |      |      |      |       |
| Flt Protected              |       |       |      |      |      |       |
| Satd. Flow (prot)          | 8375  | 0     | 0    | 6344 | 0    | 0     |
| Flt Permitted              |       |       |      |      |      |       |
| Satd. Flow (perm)          | 8375  | 0     | 0    | 6344 | 0    | 0     |
| Link Speed (mph)           | 45    |       |      | 45   | 30   |       |
| Link Distance (ft)         | 130   |       |      | 274  | 262  |       |
| Travel Time (s)            | 2.0   |       |      | 4.2  | 6.0  |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92 | 0.92 | 0.92  |
| Adj. Flow (vph)            | 1651  | 170   | 0    | 2574 | 0    | 0     |
| Shared Lane Traffic (%)    |       |       |      |      |      |       |
| Lane Group Flow (vph)      | 1821  | 0     | 0    | 2574 | 0    | 0     |
| Enter Blocked Intersection | Yes   | Yes   | Yes  | Yes  | No   | No    |
| Lane Alignment             | Left  | Right | Left | Left | Left | Right |
| Median Width(ft)           | 5     |       |      | 5    | 0    |       |
| Link Offset(ft)            | 0     |       |      | 0    | 0    |       |
| Crosswalk Width(ft)        | 16    |       |      | 16   | 16   |       |
| Two way Left Turn Lane     |       |       |      |      |      |       |
| Headway Factor             | 1.00  | 1.00  | 1.01 | 1.01 | 1.00 | 1.00  |
| Turning Speed (mph)        |       | 9     | 15   |      | 15   | 9     |
| Sign Control               | Free  |       |      | Free | Stop |       |

## Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 37.6% ICU Level of Service A

Analysis Period (min) 15

## Lanes, Volumes, Timings

9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | ↑     | ↑↑↑   | ↑     | ↑↑    | ↑↑↑   | ↑     |       | ↑     | ↑↑    | ↑     | ↑↑    | ↑     |
| Traffic Volume (vph)       | 30    | 1571  | 5     | 18    | 2421  | 90    | 1     | 0     | 9     | 49    | 1     | 31    |
| Future Volume (vph)        | 30    | 1571  | 5     | 18    | 2421  | 90    | 1     | 0     | 9     | 49    | 1     | 31    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       |       | 1%    |       |       |       | 3%    |       |       | 3%    |
| Storage Length (ft)        | 375   |       | 350   | 520   |       | 235   | 0     |       | 220   | 0     |       | 340   |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     |       | 1     | 1     |       | 2     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.950 |       | 0.950 | 0.954 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1743  | 2745  | 1656  | 1663  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.950 |       | 0.950 | 0.954 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1743  | 2745  | 1656  | 1663  | 1560  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 173   |       |       | 176   |       |       | 231   |       |       | 221   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 25    |       |       | 35    |       |       |
| Link Distance (ft)         | 2513  |       |       | 1244  |       |       | 756   |       |       | 930   |       |       |
| Travel Time (s)            | 38.1  |       |       | 18.8  |       |       | 20.6  |       |       | 18.1  |       |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 33    | 1708  | 5     | 20    | 2632  | 98    | 1     | 0     | 10    | 53    | 1     | 34    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       |       | 49%   |       |       |
| Lane Group Flow (vph)      | 33    | 1708  | 5     | 20    | 2632  | 98    | 0     | 1     | 10    | 27    | 27    | 34    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       | 6     |       |       | 2     |       |       | 4     |       | 4     |       | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.7  | 39.6  | 39.6  | 13.3  | 34.9  | 34.9  | 12.8  | 12.8  | 12.8  | 14.1  | 14.1  | 14.1  |
| Total Split (s)            | 16.0  | 92.0  | 92.0  | 16.0  | 92.0  | 92.0  | 15.0  | 15.0  | 15.0  | 17.0  | 17.0  | 17.0  |
| Total Split (%)            | 11.4% | 65.7% | 65.7% | 11.4% | 65.7% | 65.7% | 10.7% | 10.7% | 10.7% | 12.1% | 12.1% | 12.1% |
| Maximum Green (s)          | 7.3   | 85.4  | 85.4  | 7.7   | 86.1  | 86.1  | 7.2   | 7.2   | 7.2   | 7.9   | 7.9   | 7.9   |
| Yellow Time (s)            | 4.1   | 5.1   | 5.1   | 3.8   | 4.7   | 4.7   | 3.0   | 3.0   | 3.0   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 4.6   | 1.5   | 1.5   | 4.5   | 1.2   | 1.2   | 4.8   | 4.8   | 4.8   | 5.2   | 5.2   | 5.2   |
| Lost Time Adjust (s)       | -4.7  | -2.6  | -2.6  | -4.3  | -1.9  | -1.9  |       | -3.8  | -3.8  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |       | 4.0   | 4.0   | 4.1   | 4.1   | 4.1   |
| Lead/Lag                   | Lead  | Lead  | Lead  | Lag   | Lag   | Lag   |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 26.0  | 26.0  |      | 22.0  | 22.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     | 0     |      | 0     | 0     |      |      |      |      |      |      |
| Act Effect Green (s)    | 11.6 | 109.0 | 109.0 | 11.2 | 109.0 | 109.0 |      | 9.6  | 9.6  | 11.4 | 11.4 | 11.4 |
| Actuated g/C Ratio      | 0.08 | 0.78  | 0.78  | 0.08 | 0.78  | 0.78  |      | 0.07 | 0.07 | 0.08 | 0.08 | 0.08 |
| v/c Ratio               | 0.22 | 0.48  | 0.00  | 0.07 | 0.74  | 0.08  |      | 0.01 | 0.02 | 0.20 | 0.20 | 0.10 |
| Control Delay           | 70.4 | 5.2   | 0.0   | 59.8 | 14.8  | 0.1   |      | 61.0 | 0.1  | 63.2 | 63.1 | 0.6  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 70.4 | 5.2   | 0.0   | 59.8 | 14.8  | 0.1   |      | 61.0 | 0.1  | 63.2 | 63.1 | 0.6  |
| LOS                     | E    | A     | A     | E    | B     | A     |      | E    | A    | E    | E    | A    |
| Approach Delay          |      | 6.4   |       |      | 14.6  |       |      | 5.6  |      |      | 39.0 |      |
| Approach LOS            |      | A     |       |      | B     |       |      | A    |      |      | D    |      |

## Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 47 (34%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 11.9

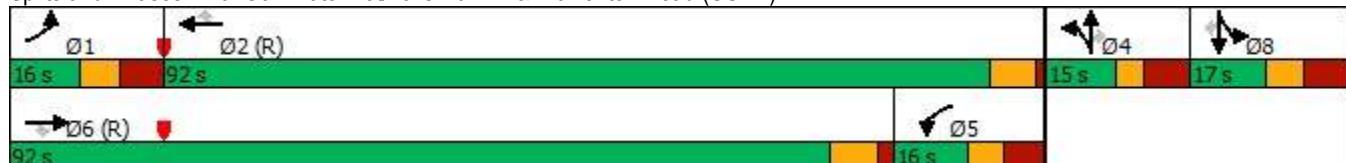
Intersection LOS: B

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

## Lanes, Volumes, Timings

16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| Traffic Volume (vph)       | 166   | 1465  | 11    | 110   | 2095  | 97    | 21    | 28    | 74    | 126   | 36    | 118   |
| Future Volume (vph)        | 166   | 1465  | 11    | 110   | 2095  | 97    | 21    | 28    | 74    | 126   | 36    | 118   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       |       | 2%    |       |       |       | 3%    |       |       | 3%    |
| Storage Length (ft)        | 335   |       | 0     | 315   |       | 0     | 0     |       | 185   | 0     |       | 210   |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.979 |       | 0.950 | 0.973 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1796  | 1560  | 1656  | 1696  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.979 |       | 0.950 | 0.973 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1796  | 1560  | 1656  | 1696  | 1560  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 190   |       |       | 251   |       |       | 231   |       |       | 219   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 20    |       |       | 35    |       |       |
| Link Distance (ft)         | 1132  |       |       | 824   |       |       | 772   |       |       | 571   |       |       |
| Travel Time (s)            | 17.2  |       |       | 12.5  |       |       | 26.3  |       |       | 11.1  |       |       |
| Peak Hour Factor           | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 182   | 1610  | 12    | 121   | 2302  | 107   | 23    | 31    | 81    | 138   | 40    | 130   |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       |       | 36%   |       |       |
| Lane Group Flow (vph)      | 182   | 1610  | 12    | 121   | 2302  | 107   | 0     | 54    | 81    | 88    | 90    | 130   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)          | 12.8  | 37.4  | 37.4  | 12.9  | 43.0  | 43.0  | 15.0  | 15.0  | 15.0  | 16.5  | 16.5  | 16.5  |
| Total Split (s)            | 26.0  | 88.0  | 88.0  | 15.0  | 77.0  | 77.0  | 17.0  | 17.0  | 17.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 18.6% | 62.9% | 62.9% | 10.7% | 55.0% | 55.0% | 12.1% | 12.1% | 12.1% | 14.3% | 14.3% | 14.3% |
| Maximum Green (s)          | 18.2  | 81.6  | 81.6  | 7.1   | 71.0  | 71.0  | 8.0   | 8.0   | 8.0   | 9.5   | 9.5   | 9.5   |
| Yellow Time (s)            | 4.0   | 4.9   | 4.9   | 3.8   | 4.7   | 4.7   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 3.8   | 1.5   | 1.5   | 4.1   | 1.3   | 1.3   | 5.1   | 5.1   | 5.1   | 6.6   | 6.6   | 6.6   |
| Lost Time Adjust (s)       | -3.8  | -2.4  | -2.4  | -3.9  | -2.0  | -2.0  |       | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |       | 4.0   | 4.0   | 5.5   | 5.5   | 5.5   |
| Lead/Lag                   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)

## Lanes, Volumes, Timings

08/31/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Minimum Gap (s)         | 3.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Time Before Reduce (s)  | 0.0  | 35.0  | 35.0  | 0.0  | 35.0  | 35.0  | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Time To Reduce (s)      | 0.0  | 1.0   | 1.0   | 0.0  | 1.0   | 1.0   | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 24.0  | 24.0  |      | 30.0  | 30.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) | 0    | 0     |       | 0    | 0     |       |      |      |      |      |      |      |
| Act Effect Green (s)    | 20.6 | 85.0  | 85.0  | 11.0 | 75.4  | 75.4  |      | 12.6 | 12.6 | 13.9 | 13.9 | 13.9 |
| Actuated g/C Ratio      | 0.15 | 0.61  | 0.61  | 0.08 | 0.54  | 0.54  |      | 0.09 | 0.09 | 0.10 | 0.10 | 0.10 |
| v/c Ratio               | 0.69 | 0.57  | 0.01  | 0.45 | 0.94  | 0.11  |      | 0.34 | 0.23 | 0.54 | 0.54 | 0.37 |
| Control Delay           | 71.1 | 17.8  | 0.0   | 82.7 | 12.9  | 0.1   |      | 65.6 | 1.5  | 72.5 | 72.1 | 3.0  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 71.1 | 17.8  | 0.0   | 82.7 | 12.9  | 0.1   |      | 65.6 | 1.5  | 72.5 | 72.1 | 3.0  |
| LOS                     | E    | B     | A     | F    | B     | A     |      | E    | A    | E    | E    | A    |
| Approach Delay          |      | 23.0  |       |      | 15.7  |       |      | 27.2 |      |      | 43.0 |      |
| Approach LOS            |      | C     |       |      | B     |       |      | C    |      |      | D    |      |

## Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 119 (85%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 20.6

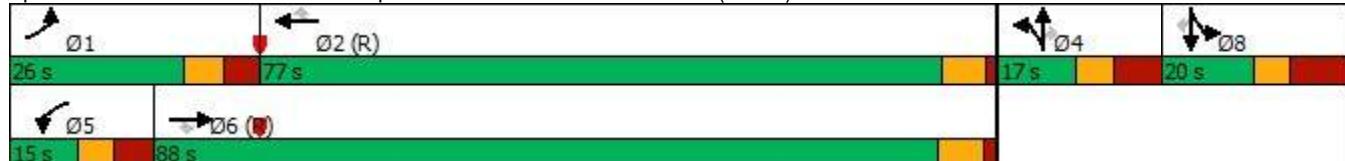
Intersection LOS: C

Intersection Capacity Utilization 72.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology supports speed limit in the range of 25 to 55 mph.



### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6256  | 6142  | 6313  | 6078  | 6138  | 6171  | 6291  |
| Vehs Exited             | 6271  | 6182  | 6360  | 6119  | 6180  | 6199  | 6296  |
| Starting Vehs           | 195   | 201   | 194   | 213   | 234   | 227   | 188   |
| Ending Vehs             | 180   | 161   | 147   | 172   | 192   | 199   | 183   |
| Travel Distance (mi)    | 5205  | 5152  | 5298  | 5047  | 5130  | 5181  | 5272  |
| Travel Time (hr)        | 207.7 | 201.4 | 207.7 | 195.4 | 199.9 | 203.5 | 206.6 |
| Total Delay (hr)        | 81.7  | 76.9  | 80.0  | 73.3  | 75.6  | 78.5  | 79.3  |
| Total Stops             | 4740  | 4387  | 4698  | 4325  | 4413  | 4488  | 4518  |
| Fuel Used (gal)         | 193.9 | 189.5 | 193.8 | 185.5 | 188.6 | 191.2 | 193.6 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6232  | 6169  | 6219  | 6202  |
| Vehs Exited             | 6264  | 6208  | 6221  | 6232  |
| Starting Vehs           | 202   | 215   | 178   | 203   |
| Ending Vehs             | 170   | 176   | 176   | 173   |
| Travel Distance (mi)    | 5206  | 5175  | 5160  | 5183  |
| Travel Time (hr)        | 207.6 | 201.0 | 207.1 | 203.8 |
| Total Delay (hr)        | 81.7  | 76.0  | 82.1  | 78.5  |
| Total Stops             | 4628  | 4475  | 4699  | 4537  |
| Fuel Used (gal)         | 194.4 | 189.7 | 192.1 | 191.2 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 7:45 |
| End Time                            | 8:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

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**Interval #1 Information Int 1**

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Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1461 | 1483 | 1623 | 1502 | 1496 | 1448 | 1515 |
| Vehs Exited          | 1456 | 1510 | 1623 | 1531 | 1545 | 1475 | 1528 |
| Starting Vehs        | 195  | 201  | 194  | 213  | 234  | 227  | 188  |
| Ending Vehs          | 200  | 174  | 194  | 184  | 185  | 200  | 175  |
| Travel Distance (mi) | 1216 | 1260 | 1357 | 1273 | 1274 | 1255 | 1264 |
| Travel Time (hr)     | 47.0 | 47.9 | 54.4 | 48.8 | 48.4 | 47.0 | 49.1 |
| Total Delay (hr)     | 17.3 | 17.5 | 21.6 | 17.9 | 17.7 | 16.9 | 18.5 |
| Total Stops          | 1021 | 1026 | 1236 | 1031 | 1037 | 986  | 1084 |
| Fuel Used (gal)      | 45.1 | 46.3 | 49.9 | 47.1 | 47.0 | 45.2 | 46.5 |

**Interval #1 Information Int 1**

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Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1552 | 1546 | 1513 | 1514 |
| Vehs Exited          | 1529 | 1533 | 1470 | 1520 |
| Starting Vehs        | 202  | 215  | 178  | 203  |
| Ending Vehs          | 225  | 228  | 221  | 194  |
| Travel Distance (mi) | 1309 | 1285 | 1248 | 1274 |
| Travel Time (hr)     | 52.6 | 50.2 | 47.2 | 49.3 |
| Total Delay (hr)     | 21.0 | 19.2 | 17.0 | 18.5 |
| Total Stops          | 1173 | 1101 | 1030 | 1069 |
| Fuel Used (gal)      | 49.4 | 47.6 | 45.8 | 47.0 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1740 | 1637 | 1713 | 1592 | 1626 | 1679 | 1680 |
| Vehs Exited          | 1729 | 1601 | 1689 | 1580 | 1608 | 1662 | 1616 |
| Starting Vehs        | 200  | 174  | 194  | 184  | 185  | 200  | 175  |
| Ending Vehs          | 211  | 210  | 218  | 196  | 203  | 217  | 239  |
| Travel Distance (mi) | 1414 | 1338 | 1427 | 1301 | 1342 | 1392 | 1396 |
| Travel Time (hr)     | 59.5 | 54.3 | 56.4 | 51.2 | 52.8 | 56.7 | 54.9 |
| Total Delay (hr)     | 25.5 | 21.8 | 22.1 | 19.8 | 20.4 | 23.0 | 21.3 |
| Total Stops          | 1421 | 1236 | 1262 | 1142 | 1201 | 1234 | 1236 |
| Fuel Used (gal)      | 53.9 | 49.6 | 52.8 | 47.7 | 49.1 | 52.0 | 51.0 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1670 | 1607 | 1657 | 1653 |
| Vehs Exited          | 1685 | 1651 | 1675 | 1650 |
| Starting Vehs        | 225  | 228  | 221  | 194  |
| Ending Vehs          | 210  | 184  | 203  | 207  |
| Travel Distance (mi) | 1382 | 1329 | 1375 | 1370 |
| Travel Time (hr)     | 54.1 | 51.8 | 55.9 | 54.8 |
| Total Delay (hr)     | 20.8 | 19.6 | 22.6 | 21.7 |
| Total Stops          | 1198 | 1181 | 1252 | 1234 |
| Fuel Used (gal)      | 51.1 | 48.7 | 51.1 | 50.7 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1519 | 1525 | 1438 | 1463 | 1502 | 1522 | 1542 |
| Vehs Exited          | 1549 | 1513 | 1457 | 1465 | 1502 | 1506 | 1593 |
| Starting Vehs        | 211  | 210  | 218  | 196  | 203  | 217  | 239  |
| Ending Vehs          | 181  | 222  | 199  | 194  | 203  | 233  | 188  |
| Travel Distance (mi) | 1262 | 1283 | 1200 | 1207 | 1253 | 1266 | 1322 |
| Travel Time (hr)     | 51.2 | 50.7 | 44.6 | 46.0 | 49.9 | 50.4 | 52.8 |
| Total Delay (hr)     | 20.6 | 19.7 | 15.6 | 16.8 | 19.4 | 19.9 | 20.9 |
| Total Stops          | 1240 | 1082 | 964  | 1062 | 1110 | 1178 | 1099 |
| Fuel Used (gal)      | 47.5 | 47.0 | 42.9 | 43.8 | 46.4 | 47.4 | 48.8 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1520 | 1523 | 1502 | 1504 |
| Vehs Exited          | 1498 | 1546 | 1490 | 1511 |
| Starting Vehs        | 210  | 184  | 203  | 207  |
| Ending Vehs          | 232  | 161  | 215  | 197  |
| Travel Distance (mi) | 1243 | 1299 | 1258 | 1259 |
| Travel Time (hr)     | 50.9 | 50.1 | 51.0 | 49.8 |
| Total Delay (hr)     | 20.7 | 18.6 | 20.7 | 19.3 |
| Total Stops          | 1168 | 1084 | 1239 | 1123 |
| Fuel Used (gal)      | 46.7 | 47.5 | 46.8 | 46.5 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1536 | 1497 | 1539 | 1521 | 1514 | 1522 | 1554 |
| Vehs Exited          | 1537 | 1558 | 1591 | 1543 | 1525 | 1556 | 1559 |
| Starting Vehs        | 181  | 222  | 199  | 194  | 203  | 233  | 188  |
| Ending Vehs          | 180  | 161  | 147  | 172  | 192  | 199  | 183  |
| Travel Distance (mi) | 1313 | 1271 | 1313 | 1266 | 1261 | 1269 | 1289 |
| Travel Time (hr)     | 50.0 | 48.5 | 52.2 | 49.4 | 48.8 | 49.5 | 49.7 |
| Total Delay (hr)     | 18.4 | 17.8 | 20.8 | 18.8 | 18.2 | 18.7 | 18.5 |
| Total Stops          | 1058 | 1043 | 1236 | 1090 | 1065 | 1090 | 1099 |
| Fuel Used (gal)      | 47.4 | 46.7 | 48.3 | 46.8 | 46.2 | 46.7 | 47.3 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1490 | 1493 | 1547 | 1521 |
| Vehs Exited          | 1552 | 1478 | 1586 | 1546 |
| Starting Vehs        | 232  | 161  | 215  | 197  |
| Ending Vehs          | 170  | 176  | 176  | 173  |
| Travel Distance (mi) | 1273 | 1261 | 1279 | 1280 |
| Travel Time (hr)     | 50.0 | 48.9 | 52.9 | 50.0 |
| Total Delay (hr)     | 19.3 | 18.6 | 21.8 | 19.1 |
| Total Stops          | 1089 | 1109 | 1178 | 1108 |
| Fuel Used (gal)      | 47.2 | 45.9 | 48.5 | 47.1 |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L   |
| Maximum Queue (ft)    | 86  | 80  | 227 | 219 | 200 | 31  | 274 | 442  | 463  | 480  | 81   | 124 |
| Average Queue (ft)    | 38  | 25  | 151 | 142 | 110 | 5   | 135 | 214  | 242  | 254  | 26   | 39  |
| 95th Queue (ft)       | 72  | 62  | 209 | 209 | 192 | 21  | 249 | 385  | 416  | 424  | 64   | 109 |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |     |
| Upstream Blk Time (%) |     |     | 1   | 1   | 0   |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     | 2   | 1   | 0   |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80  |
| Storage Blk Time (%)  |     |     |     |     |     |     |     | 0    | 0    |      |      | 1   |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 0    | 0    |      |      | 4   |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB |
|-----------------------|-----|-----|------|------|----|
| Directions Served     | LT  | R   | L    | LT   | R  |
| Maximum Queue (ft)    | 194 | 191 | 190  | 199  | 92 |
| Average Queue (ft)    | 84  | 83  | 119  | 113  | 40 |
| 95th Queue (ft)       | 159 | 156 | 189  | 189  | 74 |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |    |
| Upstream Blk Time (%) | 0   | 0   |      |      |    |
| Queuing Penalty (veh) | 1   | 0   |      |      |    |
| Storage Bay Dist (ft) |     | 215 |      | 256  |    |
| Storage Blk Time (%)  | 20  | 0   |      | 0    |    |
| Queuing Penalty (veh) | 55  | 0   |      | 0    |    |

Intersection: 2: Commerce Pkwy & Driveway 2

| Movement              | EB  | NB  |
|-----------------------|-----|-----|
| Directions Served     | LR  | LT  |
| Maximum Queue (ft)    | 133 | 37  |
| Average Queue (ft)    | 62  | 2   |
| 95th Queue (ft)       | 104 | 18  |
| Link Distance (ft)    | 156 | 924 |
| Upstream Blk Time (%) | 0   |     |
| Queuing Penalty (veh) | 0   |     |
| Storage Bay Dist (ft) |     |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 3: Driveway 1 & Warrenton Road (US 17)

| Movement              | EB | EB | EB | WB  | WB  |
|-----------------------|----|----|----|-----|-----|
| Directions Served     | T  | T  | TR | T   | T   |
| Maximum Queue (ft)    | 16 | 2  | 15 | 26  | 25  |
| Average Queue (ft)    | 0  | 0  | 0  | 1   | 1   |
| 95th Queue (ft)       | 7  | 2  | 8  | 18  | 21  |
| Link Distance (ft)    | 75 | 75 | 75 | 208 | 208 |
| Upstream Blk Time (%) |    |    |    | 0   | 0   |
| Queuing Penalty (veh) |    |    |    | 0   | 0   |
| Storage Bay Dist (ft) |    |    |    |     |     |
| Storage Blk Time (%)  |    |    |    |     |     |
| Queuing Penalty (veh) |    |    |    |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB | WB  | WB  | WB   | WB   | WB   | WB | NB  |
|-----------------------|-----|------|------|------|----|-----|-----|------|------|------|----|-----|
| Directions Served     | L   | T    | T    | T    | R  | L   | L   | T    | T    | T    | R  | LT  |
| Maximum Queue (ft)    | 145 | 401  | 415  | 410  | 80 | 8   | 40  | 325  | 294  | 246  | 32 | 11  |
| Average Queue (ft)    | 23  | 30   | 30   | 35   | 3  | 0   | 5   | 141  | 120  | 83   | 1  | 1   |
| 95th Queue (ft)       | 88  | 215  | 221  | 218  | 58 | 4   | 23  | 294  | 268  | 207  | 29 | 6   |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |    |     |     | 1184 | 1184 | 1184 |    | 680 |
| Upstream Blk Time (%) |     |      |      |      |    |     |     |      |      |      |    |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      |    |     |
| Storage Bay Dist (ft) | 375 |      |      |      |    | 350 | 520 | 520  |      |      |    | 235 |
| Storage Blk Time (%)  |     | 1    |      |      |    | 1   |     |      |      |      |    | 0   |
| Queuing Penalty (veh) |     | 0    |      |      |    | 0   |     |      |      |      |    | 0   |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | R   | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 34  | 2   | 85  | 40  | 57  |
| Average Queue (ft)    | 7   | 0   | 31  | 6   | 19  |
| 95th Queue (ft)       | 25  | 2   | 72  | 29  | 47  |
| Link Distance (ft)    | 680 |     | 833 |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 220 |     | 340 | 340 |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

Queuing and Blocking Report  
Baseline

2022 Build - AM  
08/31/2020

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 276 | 379  | 364  | 294  | 26   | 101 | 178 | 363 | 322 | 229 | 38  | 108 |
| Average Queue (ft)    | 158 | 226  | 195  | 147  | 3    | 38  | 70  | 182 | 137 | 94  | 7   | 45  |
| 95th Queue (ft)       | 262 | 348  | 313  | 257  | 16   | 84  | 137 | 311 | 259 | 185 | 25  | 94  |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 335  |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  |     | 1    | 0    |      |      |     |     |     | 1   |     |     |     |
| Queuing Penalty (veh) |     | 3    | 1    |      |      |     |     |     | 1   |     |     |     |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|
| Directions Served     | R  | L   | LT  | R   |
| Maximum Queue (ft)    | 87 | 143 | 133 | 136 |
| Average Queue (ft)    | 36 | 71  | 62  | 55  |
| 95th Queue (ft)       | 68 | 129 | 120 | 111 |
| Link Distance (ft)    |    | 464 | 464 |     |
| Upstream Blk Time (%) |    |     |     |     |
| Queuing Penalty (veh) |    |     |     |     |
| Storage Bay Dist (ft) |    | 185 |     | 210 |
| Storage Blk Time (%)  |    |     |     |     |
| Queuing Penalty (veh) |    |     |     |     |

Network Summary

Network wide Queuing Penalty: 69

## Lanes, Volumes, Timings

2022 Build - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group                 |       |       |       |       |       |       |       |       |       |       |       |       |
| Lane Configurations        | ↑↑    | ↑↑↑↑  | ↑     | ↑     | ↑↑↑↑  | ↑     | ↑↑    | ↑↑    | ↑↑    | ↑↑    | ↑↑    | ↑↑    |
| Traffic Volume (vph)       | 148   | 1422  | 59    | 72    | 1560  | 232   | 62    | 53    | 271   | 223   | 54    | 134   |
| Future Volume (vph)        | 148   | 1422  | 59    | 72    | 1560  | 232   | 62    | 53    | 271   | 223   | 54    | 134   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |       |
| Storage Length (ft)        | 0     | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |       |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.995 |       | 0.950 | 0.970 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1770  | 1591  | 1664  | 1699  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.995 |       | 0.950 | 0.970 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1770  | 1591  | 1664  | 1699  | 1567  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       | Yes   |       | Yes   |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 111   |       |       | 251   |       |       | 217   |       |       | 217   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 163   | 1563  | 65    | 79    | 1714  | 255   | 68    | 58    | 298   | 245   | 59    | 147   |
| Shared Lane Traffic (%)    |       |       |       |       |       | 10%   |       |       |       | 39%   |       |       |
| Lane Group Flow (vph)      | 163   | 1563  | 65    | 79    | 1714  | 255   | 61    | 65    | 298   | 149   | 155   | 147   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  |
| Total Split (s)            | 18.0  | 85.0  | 17.0  | 15.0  | 82.0  | 33.0  | 17.0  | 17.0  | 17.0  | 33.0  | 33.0  | 33.0  |
| Total Split (%)            | 12.0% | 56.7% | 11.3% | 10.0% | 54.7% | 22.0% | 11.3% | 11.3% | 11.3% | 22.0% | 22.0% | 22.0% |
| Maximum Green (s)          | 9.5   | 79.0  | 7.3   | 6.4   | 76.0  | 23.3  | 7.3   | 7.3   | 7.3   | 23.3  | 23.3  | 23.3  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   | 4.7   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |



| Lane Group              | EBL  | EBT   | EBR  | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None | None | C-Max | None  | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   |      |      |       | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 11.0  |      |      |       | 11.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |      |      |       | 0     |      |      |      |      |      |      |
| Act Effct Green (s)     | 14.0 | 83.6  | 99.9 | 12.8 | 82.5  | 110.3 | 12.3 | 12.3 | 12.3 | 23.8 | 23.8 | 23.8 |
| Actuated g/C Ratio      | 0.09 | 0.56  | 0.67 | 0.09 | 0.55  | 0.74  | 0.08 | 0.08 | 0.08 | 0.16 | 0.16 | 0.16 |
| v/c Ratio               | 0.51 | 0.61  | 0.06 | 0.53 | 0.68  | 0.21  | 0.44 | 0.45 | 0.91 | 0.56 | 0.57 | 0.34 |
| Control Delay           | 55.4 | 10.2  | 0.1  | 61.9 | 30.8  | 1.0   | 76.2 | 76.1 | 49.8 | 66.1 | 66.4 | 2.6  |
| Queue Delay             | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 55.4 | 10.2  | 0.1  | 61.9 | 30.8  | 1.0   | 76.2 | 76.1 | 49.8 | 66.1 | 66.4 | 2.6  |
| LOS                     | E    | B     | A    | E    | C     | A     | E    | E    | D    | E    | E    | A    |
| Approach Delay          |      | 13.9  |      |      |       | 28.3  |      |      | 57.6 |      |      | 45.5 |
| Approach LOS            |      | B     |      |      |       | C     |      |      | E    |      |      | D    |

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 49 (33%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 27.1

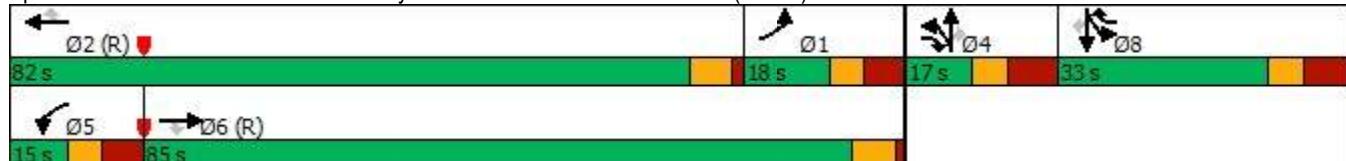
Intersection LOS: C

Intersection Capacity Utilization 63.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



HCM 6th Signalized Intersection Summary  
1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

2022 Build - PM

08/31/2020



| Movement                         | EBL   | EBT  | EBR  | WBL  | WBT   | WBR   | NBL  | NBT  | NBR   | SBL  | SBT  | SBR  |
|----------------------------------|-------|------|------|------|-------|-------|------|------|-------|------|------|------|
| Lane Configurations              | ↑↑    | ↑↑↑↑ | ↑    | ↑    | ↑↑↑↑  | ↑     | ↑↑   | ↑↑   | ↑     | ↑↑   | ↑↑   | ↑    |
| Traffic Volume (veh/h)           | 148   | 1422 | 59   | 72   | 1560  | 232   | 62   | 53   | 271   | 223  | 54   | 134  |
| Future Volume (veh/h)            | 148   | 1422 | 59   | 72   | 1560  | 232   | 62   | 53   | 271   | 223  | 54   | 134  |
| Initial Q (Q <sub>b</sub> ), veh | 0     | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0     | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)              | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |      | 1.00  | 1.00 |      | 1.00 |
| Parking Bus, Adj                 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach            | No    |      | No   |      | No    |       | No   |      | No    |      | No   |      |
| Adj Sat Flow, veh/h/ln           | 1870  | 1707 | 1870 | 1864 | 1701  | 1864  | 1909 | 1909 | 1909  | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h             | 163   | 1563 | 65   | 79   | 1714  | 255   | 63   | 65   | 298   | 152  | 189  | 147  |
| Peak Hour Factor                 | 0.91  | 0.91 | 0.91 | 0.91 | 0.91  | 0.91  | 0.91 | 0.91 | 0.91  | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, %             | 2     | 13   | 2    | 2    | 13    | 2     | 2    | 2    | 2     | 2    | 2    | 2    |
| Cap, veh/h                       | 437   | 2593 | 1044 | 130  | 2415  | 1099  | 149  | 157  | 133   | 274  | 287  | 244  |
| Arrive On Green                  | 0.13  | 0.56 | 0.58 | 0.07 | 0.52  | 0.54  | 0.08 | 0.08 | 0.08  | 0.16 | 0.16 | 0.16 |
| Sat Flow, veh/h                  | 3456  | 4661 | 1585 | 1776 | 4645  | 1580  | 1818 | 1909 | 1618  | 1759 | 1847 | 1565 |
| Grp Volume(v), veh/h             | 163   | 1563 | 65   | 79   | 1714  | 255   | 63   | 65   | 298   | 152  | 189  | 147  |
| Grp Sat Flow(s), veh/h/ln        | 1728  | 1554 | 1585 | 1776 | 1548  | 1580  | 1818 | 1909 | 1618  | 1759 | 1847 | 1565 |
| Q Serve(g_s), s                  | 6.5   | 33.6 | 2.2  | 6.5  | 42.1  | 8.8   | 4.9  | 4.9  | 12.3  | 12.0 | 14.4 | 13.1 |
| Cycle Q Clear(g_c), s            | 6.5   | 33.6 | 2.2  | 6.5  | 42.1  | 8.8   | 4.9  | 4.9  | 12.3  | 12.0 | 14.4 | 13.1 |
| Prop In Lane                     | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |      | 1.00  | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h           | 437   | 2593 | 1044 | 130  | 2415  | 1099  | 149  | 157  | 133   | 274  | 287  | 244  |
| V/C Ratio(X)                     | 0.37  | 0.60 | 0.06 | 0.61 | 0.71  | 0.23  | 0.42 | 0.42 | 2.25  | 0.56 | 0.66 | 0.60 |
| Avail Cap(c_a), veh/h            | 437   | 2593 | 1044 | 130  | 2415  | 1099  | 149  | 157  | 133   | 332  | 348  | 295  |
| HCM Platoon Ratio                | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)               | 1.00  | 1.00 | 1.00 | 0.71 | 0.71  | 0.71  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh         | 60.1  | 22.2 | 9.1  | 67.4 | 27.4  | 8.3   | 65.5 | 65.4 | 68.8  | 58.5 | 59.6 | 59.0 |
| Incr Delay (d2), s/veh           | 0.5   | 1.0  | 0.1  | 5.6  | 1.3   | 0.4   | 1.9  | 1.8  | 584.2 | 1.8  | 3.3  | 2.4  |
| Initial Q Delay(d3), s/veh       | 0.0   | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln        | 2.8   | 12.0 | 1.0  | 3.1  | 15.2  | 4.8   | 2.4  | 2.4  | 26.6  | 5.5  | 7.0  | 5.4  |
| Unsig. Movement Delay, s/veh     |       |      |      |      |       |       |      |      |       |      |      |      |
| LnGrp Delay(d), s/veh            | 60.6  | 23.3 | 9.2  | 73.0 | 28.7  | 8.6   | 67.4 | 67.2 | 653.0 | 60.3 | 62.9 | 61.4 |
| LnGrp LOS                        | E     | C    | A    | E    | C     | A     | E    | E    | F     | E    | E    | E    |
| Approach Vol, veh/h              | 1791  |      |      |      | 2048  |       |      |      | 426   |      |      | 488  |
| Approach Delay, s/veh            | 26.1  |      |      |      | 27.9  |       |      |      | 477.0 |      |      | 61.6 |
| Approach LOS                     | C     |      |      |      | C     |       |      |      | F     |      |      | E    |
| Timer - Assigned Phs             | 1     | 2    |      | 4    | 5     | 6     |      | 8    |       |      |      |      |
| Phs Duration (G+Y+Rc), s         | 23.0  | 82.0 |      | 17.0 | 15.0  | 90.0  |      | 28.0 |       |      |      |      |
| Change Period (Y+Rc), s          | * 8.5 | 6.0  |      | 9.7  | * 8.6 | * 8.5 |      | 9.7  |       |      |      |      |
| Max Green Setting (Gmax), s      | * 9.5 | 76.0 |      | 7.3  | * 6.4 | * 79  |      | 23.3 |       |      |      |      |
| Max Q Clear Time (g_c+l1), s     | 8.5   | 44.1 |      | 14.3 | 8.5   | 35.6  |      | 17.4 |       |      |      |      |
| Green Ext Time (p_c), s          | 0.1   | 31.2 |      | 0.0  | 0.0   | 41.7  |      | 0.9  |       |      |      |      |

#### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 70.9 |
| HCM 6th LOS        | E    |

#### Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings  
2: Commerce Pkwy & Driveway 2

2022 Build - PM

08/31/2020



| Lane Group                 | EBL   | EBR   | NBL  | NBT   | SBT   | SBR   |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations        |       |       |      |       |       |       |
| Traffic Volume (vph)       | 191   | 1     | 8    | 196   | 128   | 57    |
| Future Volume (vph)        | 191   | 1     | 8    | 196   | 128   | 57    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |      | -1%   | 0%    |       |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Frt                        | 0.999 |       |      |       | 0.958 |       |
| Flt Protected              | 0.953 |       |      | 0.998 |       |       |
| Satd. Flow (prot)          | 1773  | 0     | 0    | 1868  | 1785  | 0     |
| Flt Permitted              | 0.953 |       |      | 0.998 |       |       |
| Satd. Flow (perm)          | 1773  | 0     | 0    | 1868  | 1785  | 0     |
| Link Speed (mph)           | 30    |       |      | 35    | 35    |       |
| Link Distance (ft)         | 191   |       |      | 948   | 318   |       |
| Travel Time (s)            | 4.3   |       |      | 18.5  | 6.2   |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)            | 208   | 1     | 9    | 213   | 139   | 62    |
| Shared Lane Traffic (%)    |       |       |      |       |       |       |
| Lane Group Flow (vph)      | 209   | 0     | 0    | 222   | 201   | 0     |
| Enter Blocked Intersection | No    | No    | No   | No    | No    | No    |
| Lane Alignment             | Left  | Right | Left | Left  | Left  | Right |
| Median Width(ft)           | 12    |       |      | 12    | 12    |       |
| Link Offset(ft)            | 0     |       |      | 0     | 0     |       |
| Crosswalk Width(ft)        | 16    |       |      | 16    | 16    |       |
| Two way Left Turn Lane     |       |       |      | Yes   |       |       |
| Headway Factor             | 1.00  | 1.00  | 0.99 | 0.99  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15    | 9     | 15   |       |       | 9     |
| Sign Control               | Stop  |       |      | Free  | Free  |       |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.1% ICU Level of Service A

Analysis Period (min) 15

| Intersection             |        |        |       |        |      |      |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh         | 4.8    |        |       |        |      |      |
| Movement                 | EBL    | EBR    | NBL   | NBT    | SBT  | SBR  |
| Lane Configurations      |        |        |       |        |      |      |
| Traffic Vol, veh/h       | 191    | 1      | 8     | 196    | 128  | 57   |
| Future Vol, veh/h        | 191    | 1      | 8     | 196    | 128  | 57   |
| Conflicting Peds, #/hr   | 0      | 0      | 0     | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop   | Free  | Free   | Free | Free |
| RT Channelized           | -      | None   | -     | None   | -    | None |
| Storage Length           | 0      | -      | -     | -      | -    | -    |
| Veh in Median Storage, # | 0      | -      | -     | 0      | 0    | -    |
| Grade, %                 | 0      | -      | -     | -1     | 0    | -    |
| Peak Hour Factor         | 92     | 92     | 92    | 92     | 92   | 92   |
| Heavy Vehicles, %        | 2      | 2      | 2     | 2      | 2    | 2    |
| Mvmt Flow                | 208    | 1      | 9     | 213    | 139  | 62   |
| Major/Minor              |        |        |       |        |      |      |
| Major/Minor              | Minor2 | Major1 |       | Major2 |      |      |
| Conflicting Flow All     | 401    | 170    | 201   | 0      | -    | 0    |
| Stage 1                  | 170    | -      | -     | -      | -    | -    |
| Stage 2                  | 231    | -      | -     | -      | -    | -    |
| Critical Hdwy            | 6.42   | 6.22   | 4.12  | -      | -    | -    |
| Critical Hdwy Stg 1      | 5.42   | -      | -     | -      | -    | -    |
| Critical Hdwy Stg 2      | 5.42   | -      | -     | -      | -    | -    |
| Follow-up Hdwy           | 3.518  | 3.318  | 2.218 | -      | -    | -    |
| Pot Cap-1 Maneuver       | 605    | 874    | 1371  | -      | -    | -    |
| Stage 1                  | 860    | -      | -     | -      | -    | -    |
| Stage 2                  | 807    | -      | -     | -      | -    | -    |
| Platoon blocked, %       | -      | -      | -     | -      | -    | -    |
| Mov Cap-1 Maneuver       | 601    | 874    | 1371  | -      | -    | -    |
| Mov Cap-2 Maneuver       | 601    | -      | -     | -      | -    | -    |
| Stage 1                  | 854    | -      | -     | -      | -    | -    |
| Stage 2                  | 807    | -      | -     | -      | -    | -    |
| Approach                 |        |        |       |        |      |      |
| Approach                 | EB     | NB     |       | SB     |      |      |
| HCM Control Delay, s     | 14.1   | 0.3    |       | 0      |      |      |
| HCM LOS                  | B      |        |       |        |      |      |
| Minor Lane/Major Mvmt    |        | NBL    | NBT   | EBLn1  | SBT  | SBR  |
| Capacity (veh/h)         | 1371   | -      | 602   | -      | -    | -    |
| HCM Lane V/C Ratio       | 0.006  | -      | 0.347 | -      | -    | -    |
| HCM Control Delay (s)    | 7.6    | -      | 14.1  | -      | -    | -    |
| HCM Lane LOS             | A      | -      | B     | -      | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 1.5   | -      | -    | -    |

Lanes, Volumes, Timings  
3: Driveway 1 & Warrenton Road (US 17)

2022 Build - PM

08/31/2020



| Lane Group                 | EBT   | EBR   | WBL  | WBT  | NBL  | NBR   |
|----------------------------|-------|-------|------|------|------|-------|
| Lane Configurations        | 6     | 1     | 1    | 4    | 1    | 1     |
| Traffic Volume (vph)       | 1629  | 127   | 0    | 1756 | 0    | 0     |
| Future Volume (vph)        | 1629  | 127   | 0    | 1756 | 0    | 0     |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900 | 1900 | 1900  |
| Grade (%)                  | 0%    |       |      | 2%   | 0%   |       |
| Lane Util. Factor          | 0.76  | 0.76  | 1.00 | 0.86 | 1.00 | 1.00  |
| Frt                        | 0.989 |       |      |      |      |       |
| Flt Protected              |       |       |      |      |      |       |
| Satd. Flow (prot)          | 8401  | 0     | 0    | 6344 | 0    | 0     |
| Flt Permitted              |       |       |      |      |      |       |
| Satd. Flow (perm)          | 8401  | 0     | 0    | 6344 | 0    | 0     |
| Link Speed (mph)           | 45    |       |      | 45   | 30   |       |
| Link Distance (ft)         | 130   |       |      | 274  | 262  |       |
| Travel Time (s)            | 2.0   |       |      | 4.2  | 6.0  |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92 | 0.92 | 0.92  |
| Adj. Flow (vph)            | 1771  | 138   | 0    | 1909 | 0    | 0     |
| Shared Lane Traffic (%)    |       |       |      |      |      |       |
| Lane Group Flow (vph)      | 1909  | 0     | 0    | 1909 | 0    | 0     |
| Enter Blocked Intersection | Yes   | Yes   | Yes  | Yes  | No   | No    |
| Lane Alignment             | Left  | Right | Left | Left | Left | Right |
| Median Width(ft)           | 5     |       |      | 5    | 0    |       |
| Link Offset(ft)            | 0     |       |      | 0    | 0    |       |
| Crosswalk Width(ft)        | 16    |       |      | 16   | 16   |       |
| Two way Left Turn Lane     |       |       |      |      |      |       |
| Headway Factor             | 1.00  | 1.00  | 1.01 | 1.01 | 1.00 | 1.00  |
| Turning Speed (mph)        |       | 9     | 15   |      | 15   | 9     |
| Sign Control               | Free  |       |      | Free | Stop |       |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 28.8% ICU Level of Service A

Analysis Period (min) 15

## Lanes, Volumes, Timings

2022 Build - PM

## 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        |       |       |       |       |       |       |       |       |       |       |       |       |
| Traffic Volume (vph)       | 63    | 1859  | 12    | 61    | 1805  | 44    | 66    | 3     | 136   | 126   | 1     | 68    |
| Future Volume (vph)        | 63    | 1859  | 12    | 61    | 1805  | 44    | 66    | 3     | 136   | 126   | 1     | 68    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       | 1%    |       |       |       | 3%    |       |       | 3%    |       |
| Storage Length (ft)        | 375   |       | 350   | 520   |       | 235   | 0     |       | 220   | 0     |       | 340   |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     |       | 1     | 1     |       | 2     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.954 |       | 0.950 | 0.953 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1750  | 2745  | 1656  | 1661  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.954 |       | 0.950 | 0.953 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1750  | 2745  | 1656  | 1661  | 1560  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       | Yes   |       |
| Satd. Flow (RTOR)          |       |       | 161   |       |       | 164   |       |       | 216   |       |       | 207   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 25    |       |       | 35    |       |       |
| Link Distance (ft)         | 2513  |       |       | 1244  |       |       | 756   |       |       | 930   |       |       |
| Travel Time (s)            | 38.1  |       |       | 18.8  |       |       | 20.6  |       |       | 18.1  |       |       |
| Peak Hour Factor           | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 68    | 1999  | 13    | 66    | 1941  | 47    | 71    | 3     | 146   | 135   | 1     | 73    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       | 50%   |       |       |       |
| Lane Group Flow (vph)      | 68    | 1999  | 13    | 66    | 1941  | 47    | 0     | 74    | 146   | 67    | 69    | 73    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 4.9   | 4.9   | 4.9   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.7  | 39.6  | 39.6  | 13.3  | 34.9  | 34.9  | 14.0  | 14.0  | 14.0  | 14.1  | 14.1  | 14.1  |
| Total Split (s)            | 16.0  | 88.0  | 88.0  | 16.0  | 88.0  | 88.0  | 25.0  | 25.0  | 25.0  | 21.0  | 21.0  | 21.0  |
| Total Split (%)            | 10.7% | 58.7% | 58.7% | 10.7% | 58.7% | 58.7% | 16.7% | 16.7% | 16.7% | 14.0% | 14.0% | 14.0% |
| Maximum Green (s)          | 7.3   | 81.4  | 81.4  | 7.7   | 82.1  | 82.1  | 17.2  | 17.2  | 17.2  | 11.9  | 11.9  | 11.9  |
| Yellow Time (s)            | 4.1   | 5.1   | 5.1   | 3.8   | 4.7   | 4.7   | 3.0   | 3.0   | 3.0   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 4.6   | 1.5   | 1.5   | 4.5   | 1.2   | 1.2   | 4.8   | 4.8   | 4.8   | 5.2   | 5.2   | 5.2   |
| Lost Time Adjust (s)       | -4.7  | -2.6  | -2.6  | -4.3  | -1.9  | -1.9  |       | -3.8  | -3.8  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |       | 4.0   | 4.0   | 4.1   | 4.1   | 4.1   |
| Lead/Lag                   | Lead  | Lead  | Lead  | Lag   | Lag   | Lag   |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 5.0   | 5.0   | 3.0   | 5.0   | 5.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Minimum Gap (s)         | 3.0  | 4.0   | 4.0   | 3.0  | 4.0   | 4.0   | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Time Before Reduce (s)  | 0.0  | 35.0  | 35.0  | 0.0  | 35.0  | 35.0  | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| Time To Reduce (s)      | 0.0  | 1.0   | 1.0   | 0.0  | 1.0   | 1.0   | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 26.0  | 26.0  |      | 22.0  | 22.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     | 0     |      | 0     | 0     |      |      |      |      |      |      |
| Act Effect Green (s)    | 11.9 | 94.9  | 94.9  | 11.7 | 94.9  | 94.9  |      | 15.6 | 15.6 | 14.6 | 14.6 | 14.6 |
| Actuated g/C Ratio      | 0.08 | 0.63  | 0.63  | 0.08 | 0.63  | 0.63  |      | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| v/c Ratio               | 0.48 | 0.69  | 0.01  | 0.25 | 0.67  | 0.04  |      | 0.41 | 0.31 | 0.42 | 0.43 | 0.22 |
| Control Delay           | 87.4 | 15.0  | 0.0   | 67.3 | 20.8  | 0.1   |      | 68.8 | 2.1  | 71.0 | 71.4 | 1.5  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 87.4 | 15.0  | 0.0   | 67.3 | 20.8  | 0.1   |      | 68.8 | 2.1  | 71.0 | 71.4 | 1.5  |
| LOS                     | F    | B     | A     | E    | C     | A     |      | E    | A    | E    | E    | A    |
| Approach Delay          |      | 17.3  |       |      | 21.8  |       |      | 24.5 |      |      | 46.8 |      |
| Approach LOS            |      | B     |       |      | C     |       |      | C    |      |      | D    |      |

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 110 (73%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 21.0

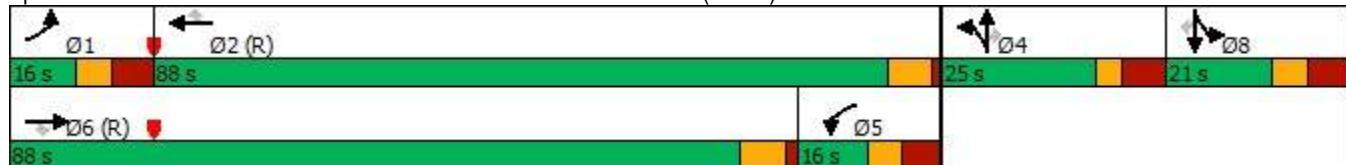
Intersection LOS: C

Intersection Capacity Utilization 60.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

## Lanes, Volumes, Timings

2022 Build - PM

16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        |       |       |       |       |       |       |       |       |       |       |       |       |
| Traffic Volume (vph)       | 203   | 1525  | 35    | 71    | 1655  | 94    | 22    | 85    | 196   | 93    | 28    | 148   |
| Future Volume (vph)        | 203   | 1525  | 35    | 71    | 1655  | 94    | 22    | 85    | 196   | 93    | 28    | 148   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       |       | 2%    |       |       |       | 3%    |       |       | 3%    |
| Storage Length (ft)        | 335   |       | 0     | 315   |       | 0     | 0     | 185   | 0     |       | 210   |       |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     | 1     | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       | 50    |       |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.990 |       | 0.950 | 0.973 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1816  | 1560  | 1656  | 1696  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.990 |       | 0.950 | 0.973 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1816  | 1560  | 1656  | 1696  | 1560  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       | Yes   |       |
| Satd. Flow (RTOR)          |       |       | 177   |       |       | 224   |       |       | 202   |       |       | 191   |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 20    |       |       | 35    |       |       |
| Link Distance (ft)         | 1132  |       |       | 824   |       |       | 772   |       |       | 571   |       |       |
| Travel Time (s)            | 17.2  |       |       | 12.5  |       |       | 26.3  |       |       | 11.1  |       |       |
| Peak Hour Factor           | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 218   | 1640  | 38    | 76    | 1780  | 101   | 24    | 91    | 211   | 100   | 30    | 159   |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       |       | 36%   |       |       |
| Lane Group Flow (vph)      | 218   | 1640  | 38    | 76    | 1780  | 101   | 0     | 115   | 211   | 64    | 66    | 159   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)          | 12.8  | 37.4  | 37.4  | 12.9  | 43.0  | 43.0  | 15.0  | 15.0  | 15.0  | 16.5  | 16.5  | 16.5  |
| Total Split (s)            | 33.0  | 96.0  | 96.0  | 14.0  | 77.0  | 77.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 22.0% | 64.0% | 64.0% | 9.3%  | 51.3% | 51.3% | 13.3% | 13.3% | 13.3% | 13.3% | 13.3% | 13.3% |
| Maximum Green (s)          | 25.2  | 89.6  | 89.6  | 6.1   | 71.0  | 71.0  | 11.0  | 11.0  | 11.0  | 9.5   | 9.5   | 9.5   |
| Yellow Time (s)            | 4.0   | 4.9   | 4.9   | 3.8   | 4.7   | 4.7   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 3.8   | 1.5   | 1.5   | 4.1   | 1.3   | 1.3   | 5.1   | 5.1   | 5.1   | 6.6   | 6.6   | 6.6   |
| Lost Time Adjust (s)       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)        | 7.8   | 6.4   | 6.4   | 7.9   | 6.0   | 6.0   |       | 9.0   | 9.0   | 10.5  | 10.5  | 10.5  |
| Lead/Lag                   | Lag   | Lead  | Lead  | Lag   | Lead  | Lead  |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 5.0   | 5.0   | 4.0   | 5.0   | 5.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT   | NBR  | SBL   | SBT   | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|-------|------|-------|-------|------|
| Minimum Gap (s)         | 3.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 2.5  | 2.5   | 2.5  | 2.5   | 2.5   | 2.5  |
| Time Before Reduce (s)  | 0.0  | 35.0  | 35.0  | 0.0  | 35.0  | 35.0  | 11.0 | 11.0  | 11.0 | 11.0  | 11.0  | 11.0 |
| Time To Reduce (s)      | 0.0  | 1.0   | 1.0   | 0.0  | 1.0   | 1.0   | 1.0  | 1.0   | 1.0  | 1.0   | 1.0   | 1.0  |
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None  | None | None  | None  | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |       |      |       |       |      |
| Flash Dont Walk (s)     |      | 24.0  | 24.0  |      | 30.0  | 30.0  |      |       |      |       |       |      |
| Pedestrian Calls (#/hr) | 0    | 0     |       | 0    | 0     |       |      |       |      |       |       |      |
| Act Effect Green (s)    | 25.2 | 90.5  | 90.5  | 6.1  | 71.9  | 71.9  |      | 11.0  | 11.0 | 8.6   | 8.6   | 8.6  |
| Actuated g/C Ratio      | 0.17 | 0.60  | 0.60  | 0.04 | 0.48  | 0.48  |      | 0.07  | 0.07 | 0.06  | 0.06  | 0.06 |
| v/c Ratio               | 0.73 | 0.59  | 0.04  | 0.55 | 0.82  | 0.12  |      | 0.86  | 0.70 | 0.68  | 0.69  | 0.59 |
| Control Delay           | 74.4 | 19.5  | 0.1   | 73.2 | 8.8   | 0.3   |      | 116.0 | 22.8 | 102.5 | 102.2 | 13.3 |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  |
| Total Delay             | 74.4 | 19.5  | 0.1   | 73.2 | 8.8   | 0.3   |      | 116.0 | 22.8 | 102.5 | 102.2 | 13.3 |
| LOS                     | E    | B     | A     | E    | A     | A     | F    | C     | F    | F     | F     | B    |
| Approach Delay          |      | 25.4  |       |      | 10.8  |       |      | 55.7  |      |       |       | 53.4 |
| Approach LOS            |      | C     |       |      | B     |       |      | E     |      |       |       | D    |

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 39 (26%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 23.1

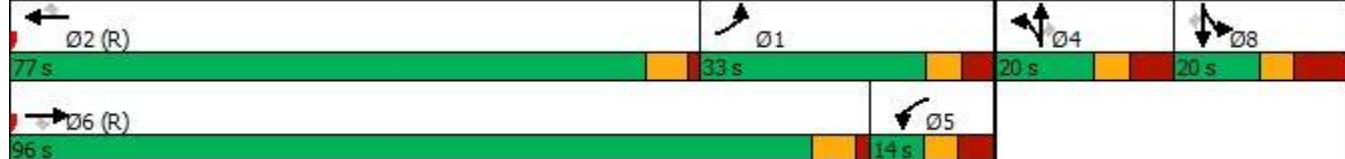
Intersection LOS: C

Intersection Capacity Utilization 74.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology supports speed limit in the range of 25 to 55 mph.



### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6103  | 6212  | 6256  | 6145  | 6059  | 6016  | 6099  |
| Vehs Exited             | 6141  | 6212  | 6272  | 6149  | 6095  | 6026  | 6078  |
| Starting Vehs           | 222   | 208   | 215   | 225   | 237   | 205   | 196   |
| Ending Vehs             | 184   | 208   | 199   | 221   | 201   | 195   | 217   |
| Travel Distance (mi)    | 4917  | 5057  | 5100  | 4952  | 4927  | 4883  | 4938  |
| Travel Time (hr)        | 214.4 | 222.4 | 223.4 | 213.9 | 211.3 | 211.7 | 213.4 |
| Total Delay (hr)        | 91.6  | 95.8  | 96.6  | 90.3  | 88.1  | 89.2  | 90.0  |
| Total Stops             | 5737  | 5914  | 5926  | 5710  | 5629  | 5673  | 5698  |
| Fuel Used (gal)         | 191.1 | 196.6 | 198.2 | 192.3 | 190.3 | 189.2 | 192.0 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6104  | 6102  | 6235  | 6132  |
| Vehs Exited             | 6101  | 6104  | 6201  | 6139  |
| Starting Vehs           | 214   | 227   | 188   | 215   |
| Ending Vehs             | 217   | 225   | 222   | 208   |
| Travel Distance (mi)    | 4942  | 4944  | 5054  | 4971  |
| Travel Time (hr)        | 215.6 | 215.4 | 221.1 | 216.3 |
| Total Delay (hr)        | 92.0  | 91.6  | 94.5  | 92.0  |
| Total Stops             | 5701  | 5682  | 5965  | 5764  |
| Fuel Used (gal)         | 191.5 | 191.6 | 196.7 | 192.9 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 4:45 |
| End Time                            | 5:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

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**Interval #1 Information Int 1**

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Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1466 | 1507 | 1573 | 1491 | 1498 | 1460 | 1435 |
| Vehs Exited          | 1497 | 1485 | 1566 | 1525 | 1532 | 1467 | 1436 |
| Starting Vehs        | 222  | 208  | 215  | 225  | 237  | 205  | 196  |
| Ending Vehs          | 191  | 230  | 222  | 191  | 203  | 198  | 195  |
| Travel Distance (mi) | 1181 | 1215 | 1284 | 1238 | 1213 | 1187 | 1159 |
| Travel Time (hr)     | 50.6 | 51.4 | 56.7 | 54.2 | 51.8 | 51.2 | 48.9 |
| Total Delay (hr)     | 21.1 | 21.0 | 24.8 | 23.4 | 21.6 | 21.3 | 20.0 |
| Total Stops          | 1299 | 1379 | 1527 | 1468 | 1389 | 1378 | 1363 |
| Fuel Used (gal)      | 46.0 | 46.6 | 50.3 | 48.6 | 46.8 | 45.6 | 44.8 |

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**Interval #1 Information Int 1**

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Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1533 | 1466 | 1511 | 1493 |
| Vehs Exited          | 1549 | 1481 | 1490 | 1504 |
| Starting Vehs        | 214  | 227  | 188  | 215  |
| Ending Vehs          | 198  | 212  | 209  | 205  |
| Travel Distance (mi) | 1259 | 1177 | 1224 | 1214 |
| Travel Time (hr)     | 54.1 | 50.8 | 52.3 | 52.2 |
| Total Delay (hr)     | 22.8 | 21.2 | 21.5 | 21.9 |
| Total Stops          | 1458 | 1360 | 1373 | 1399 |
| Fuel Used (gal)      | 48.2 | 45.8 | 47.0 | 47.0 |

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**Interval #2 Information Int 2**

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|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1659 | 1650 | 1639 | 1608 | 1592 | 1681 | 1648 |
| Vehs Exited          | 1620 | 1640 | 1630 | 1568 | 1562 | 1653 | 1615 |
| Starting Vehs        | 191  | 230  | 222  | 191  | 203  | 198  | 195  |
| Ending Vehs          | 230  | 240  | 231  | 231  | 233  | 226  | 228  |
| Travel Distance (mi) | 1300 | 1353 | 1341 | 1263 | 1286 | 1363 | 1329 |
| Travel Time (hr)     | 58.7 | 60.3 | 59.8 | 55.4 | 55.8 | 61.3 | 58.0 |
| Total Delay (hr)     | 26.1 | 26.4 | 26.4 | 23.7 | 23.6 | 27.3 | 24.9 |
| Total Stops          | 1569 | 1572 | 1573 | 1496 | 1488 | 1592 | 1549 |
| Fuel Used (gal)      | 50.7 | 52.7 | 52.2 | 49.1 | 49.7 | 53.4 | 51.7 |

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**Interval #2 Information Int 2**

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|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1583 | 1600 | 1682 | 1631 |
| Vehs Exited          | 1560 | 1583 | 1638 | 1608 |
| Starting Vehs        | 198  | 212  | 209  | 205  |
| Ending Vehs          | 221  | 229  | 253  | 229  |
| Travel Distance (mi) | 1275 | 1285 | 1345 | 1314 |
| Travel Time (hr)     | 56.6 | 58.0 | 61.5 | 58.5 |
| Total Delay (hr)     | 24.7 | 25.9 | 27.8 | 25.7 |
| Total Stops          | 1479 | 1544 | 1698 | 1555 |
| Fuel Used (gal)      | 49.9 | 50.3 | 53.2 | 51.3 |

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**Interval #3 Information Int 3**

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Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1477 | 1568 | 1477 | 1511 | 1450 | 1435 | 1520 |
| Vehs Exited          | 1504 | 1581 | 1540 | 1532 | 1485 | 1458 | 1539 |
| Starting Vehs        | 230  | 240  | 231  | 231  | 233  | 226  | 228  |
| Ending Vehs          | 203  | 227  | 168  | 210  | 198  | 203  | 209  |
| Travel Distance (mi) | 1203 | 1282 | 1204 | 1227 | 1193 | 1178 | 1242 |
| Travel Time (hr)     | 53.3 | 57.1 | 52.9 | 53.3 | 50.5 | 50.2 | 54.4 |
| Total Delay (hr)     | 23.2 | 25.1 | 22.9 | 22.7 | 20.8 | 20.7 | 23.2 |
| Total Stops          | 1455 | 1527 | 1425 | 1457 | 1324 | 1380 | 1413 |
| Fuel Used (gal)      | 46.9 | 50.4 | 46.9 | 47.6 | 46.1 | 45.4 | 48.6 |

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**Interval #3 Information Int 3**

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Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1472 | 1505 | 1505 | 1491 |
| Vehs Exited          | 1482 | 1529 | 1560 | 1519 |
| Starting Vehs        | 221  | 229  | 253  | 229  |
| Ending Vehs          | 211  | 205  | 198  | 199  |
| Travel Distance (mi) | 1183 | 1236 | 1260 | 1221 |
| Travel Time (hr)     | 51.9 | 54.0 | 54.3 | 53.2 |
| Total Delay (hr)     | 22.2 | 22.9 | 22.8 | 22.7 |
| Total Stops          | 1401 | 1464 | 1430 | 1426 |
| Fuel Used (gal)      | 46.3 | 47.9 | 49.1 | 47.5 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1501 | 1487 | 1567 | 1535 | 1519 | 1440 | 1496 |
| Vehs Exited          | 1520 | 1506 | 1536 | 1524 | 1516 | 1448 | 1488 |
| Starting Vehs        | 203  | 227  | 168  | 210  | 198  | 203  | 209  |
| Ending Vehs          | 184  | 208  | 199  | 221  | 201  | 195  | 217  |
| Travel Distance (mi) | 1233 | 1206 | 1270 | 1224 | 1235 | 1155 | 1208 |
| Travel Time (hr)     | 51.9 | 53.5 | 53.9 | 51.0 | 53.2 | 48.9 | 52.2 |
| Total Delay (hr)     | 21.2 | 23.3 | 22.5 | 20.6 | 22.1 | 19.9 | 21.9 |
| Total Stops          | 1414 | 1436 | 1401 | 1289 | 1428 | 1323 | 1373 |
| Fuel Used (gal)      | 47.5 | 46.8 | 48.8 | 47.0 | 47.7 | 44.8 | 46.9 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1516 | 1531 | 1537 | 1512 |
| Vehs Exited          | 1510 | 1511 | 1513 | 1507 |
| Starting Vehs        | 211  | 205  | 198  | 199  |
| Ending Vehs          | 217  | 225  | 222  | 208  |
| Travel Distance (mi) | 1225 | 1246 | 1224 | 1223 |
| Travel Time (hr)     | 53.0 | 52.7 | 53.1 | 52.3 |
| Total Delay (hr)     | 22.4 | 21.6 | 22.4 | 21.8 |
| Total Stops          | 1363 | 1314 | 1464 | 1376 |
| Fuel Used (gal)      | 47.2 | 47.6 | 47.4 | 47.2 |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L   |
| Maximum Queue (ft)    | 142 | 135 | 205 | 210 | 196 | 37  | 155 | 407  | 443  | 455  | 75   | 126 |
| Average Queue (ft)    | 73  | 62  | 139 | 126 | 102 | 6   | 70  | 237  | 270  | 287  | 29   | 48  |
| 95th Queue (ft)       | 127 | 113 | 199 | 200 | 184 | 23  | 134 | 365  | 394  | 410  | 63   | 126 |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |     |
| Upstream Blk Time (%) |     |     | 0   | 0   | 0   |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     | 0   | 0   | 0   |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80  |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      | 0    |      |      | 2   |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      | 0    |      |      | 9   |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 217 | 204 | 212  | 211  | 122 |
| Average Queue (ft)    | 116 | 108 | 135  | 123  | 48  |
| 95th Queue (ft)       | 205 | 193 | 199  | 196  | 92  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) | 2   | 1   |      |      |     |
| Queuing Penalty (veh) | 8   | 0   |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 36  | 1   |      | 0    |     |
| Queuing Penalty (veh) | 109 | 1   |      | 0    |     |

Intersection: 2: Commerce Pkwy & Driveway 2

| Movement              | EB  | NB  | SB  |
|-----------------------|-----|-----|-----|
| Directions Served     | LR  | LT  | TR  |
| Maximum Queue (ft)    | 150 | 54  | 2   |
| Average Queue (ft)    | 61  | 5   | 0   |
| 95th Queue (ft)       | 115 | 32  | 2   |
| Link Distance (ft)    | 156 | 924 | 206 |
| Upstream Blk Time (%) | 2   |     |     |
| Queuing Penalty (veh) | 0   |     |     |
| Storage Bay Dist (ft) |     |     |     |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

Intersection: 3: Driveway 1 & Warrenton Road (US 17)

| Movement              | EB | EB | EB | WB  | WB  | WB  |
|-----------------------|----|----|----|-----|-----|-----|
| Directions Served     | T  | T  | TR | T   | T   | T   |
| Maximum Queue (ft)    | 2  | 8  | 9  | 4   | 6   | 15  |
| Average Queue (ft)    | 0  | 0  | 0  | 0   | 0   | 1   |
| 95th Queue (ft)       | 2  | 7  | 7  | 4   | 6   | 9   |
| Link Distance (ft)    | 75 | 75 | 75 | 208 | 208 | 208 |
| Upstream Blk Time (%) |    |    |    |     |     |     |
| Queuing Penalty (veh) |    |    |    |     |     |     |
| Storage Bay Dist (ft) |    |    |    |     |     |     |
| Storage Blk Time (%)  |    |    |    |     |     |     |
| Queuing Penalty (veh) |    |    |    |     |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB | WB  | WB  | WB   | WB   | WB   | WB  | NB  |
|-----------------------|-----|------|------|------|----|-----|-----|------|------|------|-----|-----|
| Directions Served     | L   | T    | T    | T    | R  | L   | L   | T    | T    | T    | R   | LT  |
| Maximum Queue (ft)    | 147 | 194  | 226  | 230  | 1  | 40  | 82  | 415  | 406  | 331  | 94  | 146 |
| Average Queue (ft)    | 58  | 91   | 111  | 119  | 0  | 5   | 30  | 228  | 199  | 151  | 4   | 62  |
| 95th Queue (ft)       | 125 | 177  | 193  | 202  | 0  | 23  | 72  | 360  | 340  | 284  | 52  | 120 |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |    |     |     | 1184 | 1184 | 1184 |     | 680 |
| Upstream Blk Time (%) |     |      |      |      |    |     |     |      |      |      |     |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      |     |     |
| Storage Bay Dist (ft) |     | 375  |      |      |    | 350 | 520 | 520  |      |      | 235 |     |
| Storage Blk Time (%)  |     |      |      |      |    |     |     |      |      |      | 2   |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      | 1   |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB  | SB  | SB  |  |
|-----------------------|-----|-----|-----|-----|-----|--|
| Directions Served     | R   | R   | L   | LT  | R   |  |
| Maximum Queue (ft)    | 161 | 134 | 162 | 137 | 77  |  |
| Average Queue (ft)    | 70  | 20  | 92  | 40  | 31  |  |
| 95th Queue (ft)       | 127 | 78  | 157 | 117 | 59  |  |
| Link Distance (ft)    | 680 |     | 833 |     |     |  |
| Upstream Blk Time (%) |     |     |     |     |     |  |
| Queuing Penalty (veh) |     |     |     |     |     |  |
| Storage Bay Dist (ft) |     | 220 |     | 340 | 340 |  |
| Storage Blk Time (%)  |     |     |     |     |     |  |
| Queuing Penalty (veh) |     |     |     |     |     |  |

Queuing and Blocking Report  
Baseline

2022 Build - PM  
08/31/2020

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 351 | 414  | 357  | 312  | 39   | 64  | 115 | 345 | 285 | 222 | 34  | 287 |
| Average Queue (ft)    | 186 | 255  | 220  | 175  | 10   | 17  | 44  | 172 | 129 | 92  | 7   | 123 |
| 95th Queue (ft)       | 311 | 377  | 336  | 291  | 31   | 48  | 92  | 287 | 230 | 172 | 23  | 243 |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 335 |      |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  | 0   | 1    |      |      |      |     |     |     | 1   |     |     | 5   |
| Queuing Penalty (veh) | 1   | 3    |      |      |      |     |     |     | 0   |     |     | 10  |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 206 | 123 | 126 | 162 |
| Average Queue (ft)    | 83  | 58  | 48  | 61  |
| 95th Queue (ft)       | 177 | 110 | 103 | 124 |
| Link Distance (ft)    |     | 464 | 464 |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 185 |     | 210 |     |
| Storage Blk Time (%)  | 1   |     | 0   |     |
| Queuing Penalty (veh) | 1   |     | 0   |     |

Network Summary

Network wide Queuing Penalty: 143



## **Appendix G**

### **Mitigated (2022) Capacity Analysis**

## Lanes, Volumes, Timings

2022 Mitigated - AM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group Configurations  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Traffic Volume (vph)       | 76    | 1410  | 33    | 133   | 2205  | 150   | 78    | 36    | 230   | 165   | 59    | 85    |
| Future Volume (vph)        | 76    | 1410  | 33    | 133   | 2205  | 150   | 78    | 36    | 230   | 165   | 59    | 85    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |       |
| Storage Length (ft)        | 0     |       | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.981 |       | 0.950 | 0.977 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1745  | 1591  | 1664  | 1712  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.981 |       | 0.950 | 0.977 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1745  | 1591  | 1664  | 1712  | 1567  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       | Yes   |       | Yes   |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 121   |       |       | 154   |       |       | 167   |       |       | 232   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 81    | 1500  | 35    | 141   | 2346  | 160   | 83    | 38    | 245   | 176   | 63    | 90    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       | 28%   |       |       | 33%   |       |       |
| Lane Group Flow (vph)      | 81    | 1500  | 35    | 141   | 2346  | 160   | 60    | 61    | 245   | 118   | 121   | 90    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | pm+ov | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     | 5     | 4     | 4     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 8     |       |       | 4     |
| Detector Phase             | 1     | 6     | 8     | 5     | 2     | 4     | 8     | 8     | 5     | 4     | 4     | 4     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.9  | 14.7  | 14.7  | 13.6  | 14.9  | 14.9  | 14.9  |
| Total Split (s)            | 16.0  | 75.0  | 22.0  | 23.0  | 82.0  | 20.0  | 22.0  | 22.0  | 23.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 11.4% | 53.6% | 15.7% | 16.4% | 58.6% | 14.3% | 15.7% | 15.7% | 16.4% | 14.3% | 14.3% | 14.3% |
| Maximum Green (s)          | 7.5   | 69.0  | 12.3  | 14.4  | 76.0  | 10.1  | 12.3  | 12.3  | 14.4  | 10.1  | 10.1  | 10.1  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 3.8   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.8   | 5.6   | 5.6   | 4.8   | 5.8   | 5.8   | 5.8   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.9   | 4.7   | 4.7   | 3.6   | 4.9   | 4.9   | 4.9   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       | Lead  |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

## Lanes, Volumes, Timings

2022 Mitigated - AM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/31/2020



| Lane Group              | EBL  | EBT   | EBR  | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|------|------|-------|------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None | None | C-Max | None |
| Walk Time (s)           |      | 7.0   |      |      |       | 7.0  |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 28.0  |      |      |       | 30.0 |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |      |      |       | 0    |      |      |      |      |      |      |
| Act Effect Green (s)    | 12.0 | 73.8  | 88.1 | 18.6 | 80.4  | 94.5 | 15.0 | 15.0 | 38.6 | 15.0 | 15.0 | 15.0 |
| Actuated g/C Ratio      | 0.09 | 0.53  | 0.63 | 0.13 | 0.57  | 0.68 | 0.11 | 0.11 | 0.28 | 0.11 | 0.11 | 0.11 |
| v/c Ratio               | 0.28 | 0.62  | 0.03 | 0.61 | 0.89  | 0.14 | 0.33 | 0.33 | 0.44 | 0.66 | 0.66 | 0.24 |
| Control Delay           | 48.9 | 12.3  | 0.1  | 66.8 | 19.0  | 0.9  | 62.3 | 62.0 | 15.5 | 78.4 | 77.9 | 1.5  |
| Queue Delay             | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 48.9 | 12.3  | 0.1  | 66.8 | 19.0  | 0.9  | 62.3 | 62.0 | 15.5 | 78.4 | 77.9 | 1.5  |
| LOS                     | D    | B     | A    | E    | B     | A    | E    | E    | B    | E    | E    | A    |
| Approach Delay          |      | 13.8  |      |      |       | 20.5 |      |      | 30.9 |      |      | 57.2 |
| Approach LOS            |      | B     |      |      |       | C    |      |      | C    |      |      | E    |

## Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 120 (86%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 21.5

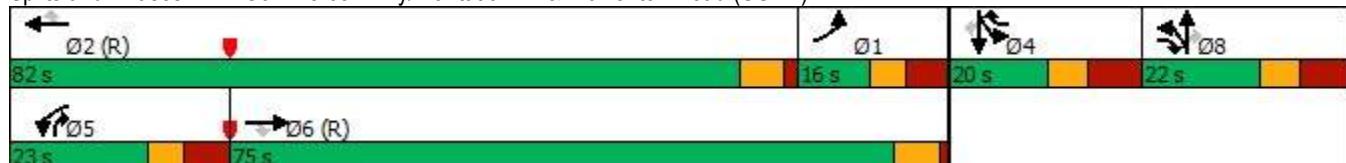
Intersection LOS: C

Intersection Capacity Utilization 70.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



HCM 6th Signalized Intersection Summary  
1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

2022 Mitigated - AM

08/31/2020

| Movement   | EBL   | EBT  | EBR  | WBL   | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--|-------|------|------|-------|-------|-------|------|------|------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑     | ↑↑↑↑  | ↑     | ↑↑   | ↑    | ↑    | ↑    | ↑↑   | ↑    |
| Traffic Volume (veh/h)   | 76    | 1410 | 33   | 133   | 2205  | 150   | 78   | 36   | 230  | 165  | 59   | 85   |
| Future Volume (veh/h)  | 76    | 1410 | 33   | 133   | 2205  | 150   | 78   | 36   | 230  | 165  | 59   | 85   |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |       | No    |       | No   |      | No   |      | No   |      |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864  | 1701  | 1864  | 1909 | 1909 | 1909 | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 81    | 1500 | 35   | 141   | 2346  | 160   | 60   | 69   | 245  | 120  | 142  | 90   |
| Peak Hour Factor   | 0.94  | 0.94 | 0.94 | 0.94  | 0.94  | 0.94  | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2     | 13    | 2     | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h   | 878   | 3126 | 1293 | 218   | 2588  | 1085  | 225  | 236  | 403  | 190  | 199  | 169  |
| Arrive On Green  | 0.25  | 0.67 | 0.69 | 0.12  | 0.56  | 0.58  | 0.12 | 0.12 | 0.12 | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776  | 4645  | 1580  | 1818 | 1909 | 1618 | 1759 | 1847 | 1565 |
| Grp Volume(v), veh/h   | 81    | 1500 | 35   | 141   | 2346  | 160   | 60   | 69   | 245  | 120  | 142  | 90   |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776  | 1548  | 1580  | 1818 | 1909 | 1618 | 1759 | 1847 | 1565 |
| Q Serve(g_s), s  | 2.5   | 21.9 | 0.6  | 10.6  | 63.3  | 4.9   | 4.2  | 4.6  | 17.3 | 9.1  | 10.4 | 7.6  |
| Cycle Q Clear(g_c), s  | 2.5   | 21.9 | 0.6  | 10.6  | 63.3  | 4.9   | 4.2  | 4.6  | 17.3 | 9.1  | 10.4 | 7.6  |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00  |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 878   | 3126 | 1293 | 218   | 2588  | 1085  | 225  | 236  | 403  | 190  | 199  | 169  |
| V/C Ratio(X)   | 0.09  | 0.48 | 0.03 | 0.65  | 0.91  | 0.15  | 0.27 | 0.29 | 0.61 | 0.63 | 0.71 | 0.53 |
| Avail Cap(c_a), veh/h  | 878   | 3126 | 1293 | 241   | 2588  | 1085  | 225  | 236  | 403  | 190  | 199  | 169  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.60  | 0.60  | 0.60  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh   | 39.9  | 11.2 | 2.4  | 58.5  | 27.7  | 7.7   | 55.6 | 55.8 | 46.5 | 59.8 | 60.4 | 59.1 |
| Incr Delay (d2), s/veh   | 0.0   | 0.5  | 0.0  | 3.1   | 3.7   | 0.2   | 0.6  | 0.7  | 2.6  | 6.7  | 11.3 | 3.2  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 1.1   | 7.0  | 0.3  | 4.9   | 22.5  | 2.3   | 2.0  | 2.3  | 7.8  | 4.4  | 5.5  | 3.2  |
| Unsig. Movement Delay, s/veh   |       |      |      |       |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh  | 39.9  | 11.7 | 2.5  | 61.6  | 31.5  | 7.8   | 56.2 | 56.5 | 49.1 | 66.5 | 71.7 | 62.3 |
| LnGrp LOS  | D     | B    | A    | E     | C     | A     | E    | E    | D    | E    | E    | E    |
| Approach Vol, veh/h  | 1616  |      |      |       | 2647  |       |      |      | 374  |      |      | 352  |
| Approach Delay, s/veh  | 12.9  |      |      |       | 31.6  |       |      |      | 51.6 |      |      | 67.5 |
| Approach LOS   | B     |      |      |       | C     |       |      |      | D    |      |      | E    |
| Timer - Assigned Phs   | 1     | 2    |      | 4     | 5     | 6     |      |      | 8    |      |      |      |
| Phs Duration (G+Y+Rc), s   | 40.3  | 82.0 |      | 20.0  | 21.2  | 101.1 |      |      | 22.0 |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | * 9.9 | * 8.6 | * 8.5 |      |      | 9.7  |      |      |      |
| Max Green Setting (Gmax), s  | * 7.5 | 76.0 |      | * 10  | * 14  | * 69  |      |      | 12.3 |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 4.5   | 65.3 |      | 12.4  | 12.6  | 23.9  |      |      | 19.3 |      |      |      |
| Green Ext Time (p_c), s  | 0.0   | 10.7 |      | 0.0   | 0.1   | 42.8  |      |      | 0.0  |      |      |      |
| Intersection Summary   |       |      |      |       |       |       |      |      |      |      |      |      |
| HCM 6th Ctrl Delay   |       |      |      | 29.6  |       |       |      |      |      |      |      |      |
| HCM 6th LOS  |       |      |      | C     |       |       |      |      |      |      |      |      |
| Notes  |       |      |      |       |       |       |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |       |       |       |      |      |      |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |       |       |       |      |      |      |      |      |      |

Lanes, Volumes, Timings  
2: Commerce Pkwy & Driveway 2

2022 Mitigated - AM

08/31/2020



| Lane Group                 | EBL   | EBR   | NBL  | NBT   | SBT   | SBR   |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations        |       |       |      |       |       |       |
| Traffic Volume (vph)       | 234   | 1     | 10   | 110   | 156   | 69    |
| Future Volume (vph)        | 234   | 1     | 10   | 110   | 156   | 69    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |      | -1%   | 0%    |       |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Frt                        | 0.999 |       |      |       | 0.959 |       |
| Flt Protected              | 0.953 |       |      | 0.996 |       |       |
| Satd. Flow (prot)          | 1773  | 0     | 0    | 1865  | 1786  | 0     |
| Flt Permitted              | 0.953 |       |      | 0.996 |       |       |
| Satd. Flow (perm)          | 1773  | 0     | 0    | 1865  | 1786  | 0     |
| Link Speed (mph)           | 30    |       |      | 35    | 35    |       |
| Link Distance (ft)         | 191   |       |      | 948   | 318   |       |
| Travel Time (s)            | 4.3   |       |      | 18.5  | 6.2   |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)            | 254   | 1     | 11   | 120   | 170   | 75    |
| Shared Lane Traffic (%)    |       |       |      |       |       |       |
| Lane Group Flow (vph)      | 255   | 0     | 0    | 131   | 245   | 0     |
| Enter Blocked Intersection | No    | No    | No   | No    | No    | No    |
| Lane Alignment             | Left  | Right | Left | Left  | Left  | Right |
| Median Width(ft)           | 12    |       |      | 12    | 12    |       |
| Link Offset(ft)            | 0     |       |      | 0     | 0     |       |
| Crosswalk Width(ft)        | 16    |       |      | 16    | 16    |       |
| Two way Left Turn Lane     |       |       |      | Yes   |       |       |
| Headway Factor             | 1.00  | 1.00  | 0.99 | 0.99  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15    | 9     | 15   |       |       | 9     |
| Sign Control               | Stop  |       |      | Free  | Free  |       |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 33.8% ICU Level of Service A

Analysis Period (min) 15

| Intersection             |        |        |       |        |      |      |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh         | 5.9    |        |       |        |      |      |
| Movement                 | EBL    | EBR    | NBL   | NBT    | SBT  | SBR  |
| Lane Configurations      |        |        |       |        |      |      |
| Traffic Vol, veh/h       | 234    | 1      | 10    | 110    | 156  | 69   |
| Future Vol, veh/h        | 234    | 1      | 10    | 110    | 156  | 69   |
| Conflicting Peds, #/hr   | 0      | 0      | 0     | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop   | Free  | Free   | Free | Free |
| RT Channelized           | -      | None   | -     | None   | -    | None |
| Storage Length           | 0      | -      | -     | -      | -    | -    |
| Veh in Median Storage, # | 0      | -      | -     | 0      | 0    | -    |
| Grade, %                 | 0      | -      | -     | -1     | 0    | -    |
| Peak Hour Factor         | 92     | 92     | 92    | 92     | 92   | 92   |
| Heavy Vehicles, %        | 2      | 2      | 2     | 2      | 2    | 2    |
| Mvmt Flow                | 254    | 1      | 11    | 120    | 170  | 75   |
| Major/Minor              |        |        |       |        |      |      |
| Major/Minor              | Minor2 | Major1 |       | Major2 |      |      |
| Conflicting Flow All     | 350    | 208    | 245   | 0      | -    | 0    |
| Stage 1                  | 208    | -      | -     | -      | -    | -    |
| Stage 2                  | 142    | -      | -     | -      | -    | -    |
| Critical Hdwy            | 6.42   | 6.22   | 4.12  | -      | -    | -    |
| Critical Hdwy Stg 1      | 5.42   | -      | -     | -      | -    | -    |
| Critical Hdwy Stg 2      | 5.42   | -      | -     | -      | -    | -    |
| Follow-up Hdwy           | 3.518  | 3.318  | 2.218 | -      | -    | -    |
| Pot Cap-1 Maneuver       | 647    | 832    | 1321  | -      | -    | -    |
| Stage 1                  | 827    | -      | -     | -      | -    | -    |
| Stage 2                  | 885    | -      | -     | -      | -    | -    |
| Platoon blocked, %       | -      | -      | -     | -      | -    | -    |
| Mov Cap-1 Maneuver       | 641    | 832    | 1321  | -      | -    | -    |
| Mov Cap-2 Maneuver       | 641    | -      | -     | -      | -    | -    |
| Stage 1                  | 820    | -      | -     | -      | -    | -    |
| Stage 2                  | 885    | -      | -     | -      | -    | -    |
| Approach                 |        |        |       |        |      |      |
| Approach                 | EB     | NB     |       | SB     |      |      |
| HCM Control Delay, s     | 14.3   | 0.6    |       | 0      |      |      |
| HCM LOS                  | B      |        |       |        |      |      |
| Minor Lane/Major Mvmt    |        | NBL    | NBT   | EBLn1  | SBT  | SBR  |
| Capacity (veh/h)         | 1321   | -      | 642   | -      | -    | -    |
| HCM Lane V/C Ratio       | 0.008  | -      | 0.398 | -      | -    | -    |
| HCM Control Delay (s)    | 7.7    | -      | 14.3  | -      | -    | -    |
| HCM Lane LOS             | A      | -      | B     | -      | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 1.9   | -      | -    | -    |

## Lanes, Volumes, Timings

2022 Mitigated - AM

## 3: Driveway 1 &amp; Warrenton Road (US 17)

08/31/2020



| Lane Group                 | EBT   | EBR   | WBL  | WBT  | NBL  | NBR   |
|----------------------------|-------|-------|------|------|------|-------|
| Lane Configurations        | 6     | 1     | 1    | 3    | 1    | 1     |
| Traffic Volume (vph)       | 1519  | 156   | 0    | 2368 | 0    | 0     |
| Future Volume (vph)        | 1519  | 156   | 0    | 2368 | 0    | 0     |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900 | 1900 | 1900  |
| Grade (%)                  | 0%    |       |      | 2%   | 0%   |       |
| Lane Util. Factor          | 0.76  | 0.76  | 1.00 | 0.86 | 1.00 | 1.00  |
| Frt                        | 0.986 |       |      |      |      |       |
| Flt Protected              |       |       |      |      |      |       |
| Satd. Flow (prot)          | 8375  | 0     | 0    | 6344 | 0    | 0     |
| Flt Permitted              |       |       |      |      |      |       |
| Satd. Flow (perm)          | 8375  | 0     | 0    | 6344 | 0    | 0     |
| Link Speed (mph)           | 45    |       |      | 45   | 30   |       |
| Link Distance (ft)         | 130   |       |      | 274  | 262  |       |
| Travel Time (s)            | 2.0   |       |      | 4.2  | 6.0  |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92 | 0.92 | 0.92  |
| Adj. Flow (vph)            | 1651  | 170   | 0    | 2574 | 0    | 0     |
| Shared Lane Traffic (%)    |       |       |      |      |      |       |
| Lane Group Flow (vph)      | 1821  | 0     | 0    | 2574 | 0    | 0     |
| Enter Blocked Intersection | Yes   | Yes   | Yes  | Yes  | No   | No    |
| Lane Alignment             | Left  | Right | Left | Left | Left | Right |
| Median Width(ft)           | 5     |       |      | 5    | 0    |       |
| Link Offset(ft)            | 0     |       |      | 0    | 0    |       |
| Crosswalk Width(ft)        | 16    |       |      | 16   | 16   |       |
| Two way Left Turn Lane     |       |       |      |      |      |       |
| Headway Factor             | 1.00  | 1.00  | 1.01 | 1.01 | 1.00 | 1.00  |
| Turning Speed (mph)        |       | 9     | 15   |      | 15   | 9     |
| Sign Control               | Free  |       |      | Free | Stop |       |

## Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 37.6% ICU Level of Service A

Analysis Period (min) 15

## Lanes, Volumes, Timings

2022 Mitigated - AM

## 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | ↑     | ↑↑↑   | ↑     | ↑↑    | ↑↑↑   | ↑     | ↑     | ↑     | ↑↑    | ↑     | ↑↑    | ↑     |
| Traffic Volume (vph)       | 30    | 1571  | 5     | 18    | 2421  | 90    | 1     | 0     | 9     | 49    | 1     | 31    |
| Future Volume (vph)        | 30    | 1571  | 5     | 18    | 2421  | 90    | 1     | 0     | 9     | 49    | 1     | 31    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       | 1%    |       |       |       | 3%    |       |       | 3%    |       |
| Storage Length (ft)        | 375   |       | 350   | 520   |       | 235   | 0     |       | 220   | 0     |       | 340   |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     |       | 1     | 1     |       | 2     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.950 |       | 0.950 | 0.954 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1743  | 2745  | 1656  | 1663  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.950 |       | 0.950 | 0.954 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1743  | 2745  | 1656  | 1663  | 1560  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 173   |       |       | 176   |       |       | 231   |       |       | 221   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 25    |       |       | 35    |       |       |
| Link Distance (ft)         | 2513  |       |       | 1244  |       |       | 756   |       |       | 930   |       |       |
| Travel Time (s)            | 38.1  |       |       | 18.8  |       |       | 20.6  |       |       | 18.1  |       |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 33    | 1708  | 5     | 20    | 2632  | 98    | 1     | 0     | 10    | 53    | 1     | 34    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       |       | 49%   |       |       |
| Lane Group Flow (vph)      | 33    | 1708  | 5     | 20    | 2632  | 98    | 0     | 1     | 10    | 27    | 27    | 34    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |       |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.7  | 39.6  | 39.6  | 13.3  | 34.9  | 34.9  | 12.8  | 12.8  | 12.8  | 14.1  | 14.1  | 14.1  |
| Total Split (s)            | 16.0  | 92.0  | 92.0  | 16.0  | 92.0  | 92.0  | 15.0  | 15.0  | 15.0  | 17.0  | 17.0  | 17.0  |
| Total Split (%)            | 11.4% | 65.7% | 65.7% | 11.4% | 65.7% | 65.7% | 10.7% | 10.7% | 10.7% | 12.1% | 12.1% | 12.1% |
| Maximum Green (s)          | 7.3   | 85.4  | 85.4  | 7.7   | 86.1  | 86.1  | 7.2   | 7.2   | 7.2   | 7.9   | 7.9   | 7.9   |
| Yellow Time (s)            | 4.1   | 5.1   | 5.1   | 3.8   | 4.7   | 4.7   | 3.0   | 3.0   | 3.0   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 4.6   | 1.5   | 1.5   | 4.5   | 1.2   | 1.2   | 4.8   | 4.8   | 4.8   | 5.2   | 5.2   | 5.2   |
| Lost Time Adjust (s)       | -4.7  | -2.6  | -2.6  | -4.3  | -1.9  | -1.9  |       | -3.8  | -3.8  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |       | 4.0   | 4.0   | 4.1   | 4.1   | 4.1   |
| Lead/Lag                   | Lead  | Lead  | Lead  | Lag   | Lag   | Lag   |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

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Synchro 10 Report



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 26.0  | 26.0  |      | 22.0  | 22.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     | 0     |      | 0     | 0     |      |      |      |      |      |      |
| Act Effect Green (s)    | 11.6 | 109.0 | 109.0 | 11.2 | 109.0 | 109.0 |      | 9.6  | 9.6  | 11.4 | 11.4 | 11.4 |
| Actuated g/C Ratio      | 0.08 | 0.78  | 0.78  | 0.08 | 0.78  | 0.78  |      | 0.07 | 0.07 | 0.08 | 0.08 | 0.08 |
| v/c Ratio               | 0.22 | 0.48  | 0.00  | 0.07 | 0.74  | 0.08  |      | 0.01 | 0.02 | 0.20 | 0.20 | 0.10 |
| Control Delay           | 70.8 | 5.4   | 0.0   | 59.8 | 14.8  | 0.1   |      | 61.0 | 0.1  | 63.2 | 63.1 | 0.6  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 70.8 | 5.4   | 0.0   | 59.8 | 14.8  | 0.1   |      | 61.0 | 0.1  | 63.2 | 63.1 | 0.6  |
| LOS                     | E    | A     | A     | E    | B     | A     |      | E    | A    | E    | E    | A    |
| Approach Delay          |      | 6.6   |       |      | 14.6  |       |      | 5.6  |      |      | 39.0 |      |
| Approach LOS            |      | A     |       |      | B     |       |      | A    |      |      | D    |      |

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 47 (34%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 12.0

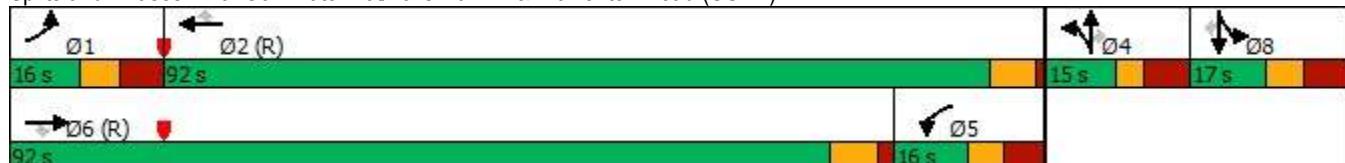
Intersection LOS: B

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

## Lanes, Volumes, Timings

2022 Mitigated - AM

16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| Traffic Volume (vph)       | 166   | 1465  | 11    | 110   | 2095  | 97    | 21    | 28    | 74    | 126   | 36    | 118   |
| Future Volume (vph)        | 166   | 1465  | 11    | 110   | 2095  | 97    | 21    | 28    | 74    | 126   | 36    | 118   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       | 2%    |       |       | 3%    |       |       | 3%    |       |       |
| Storage Length (ft)        | 335   |       | 0     | 315   |       | 0     | 0     | 185   | 0     |       | 210   |       |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     | 1     | 1     | 1     | 1     |       |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       | 50    |       |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.979 |       | 0.950 | 0.973 |       |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1796  | 1560  | 1656  | 1696  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.979 |       | 0.950 | 0.973 |       |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1796  | 1560  | 1656  | 1696  | 1560  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 190   |       |       | 251   |       |       | 231   |       |       | 219   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 20    |       |       | 35    |       |       |
| Link Distance (ft)         | 1132  |       |       | 824   |       |       | 772   |       |       | 571   |       |       |
| Travel Time (s)            | 17.2  |       |       | 12.5  |       |       | 26.3  |       |       | 11.1  |       |       |
| Peak Hour Factor           | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 182   | 1610  | 12    | 121   | 2302  | 107   | 23    | 31    | 81    | 138   | 40    | 130   |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       |       | 36%   |       |       |
| Lane Group Flow (vph)      | 182   | 1610  | 12    | 121   | 2302  | 107   | 0     | 54    | 81    | 88    | 90    | 130   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)          | 12.8  | 37.4  | 37.4  | 12.9  | 43.0  | 43.0  | 15.0  | 15.0  | 15.0  | 16.5  | 16.5  | 16.5  |
| Total Split (s)            | 26.0  | 88.0  | 88.0  | 15.0  | 77.0  | 77.0  | 17.0  | 17.0  | 17.0  | 20.0  | 20.0  | 20.0  |
| Total Split (%)            | 18.6% | 62.9% | 62.9% | 10.7% | 55.0% | 55.0% | 12.1% | 12.1% | 12.1% | 14.3% | 14.3% | 14.3% |
| Maximum Green (s)          | 18.2  | 81.6  | 81.6  | 7.1   | 71.0  | 71.0  | 8.0   | 8.0   | 8.0   | 9.5   | 9.5   | 9.5   |
| Yellow Time (s)            | 4.0   | 4.9   | 4.9   | 3.8   | 4.7   | 4.7   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 3.8   | 1.5   | 1.5   | 4.1   | 1.3   | 1.3   | 5.1   | 5.1   | 5.1   | 6.6   | 6.6   | 6.6   |
| Lost Time Adjust (s)       | -3.8  | -2.4  | -2.4  | -3.9  | -2.0  | -2.0  |       | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |       | 4.0   | 4.0   | 5.5   | 5.5   | 5.5   |
| Lead/Lag                   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

2022 Mitigated - AM

Synchro 10 Report

ER

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| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Minimum Gap (s)         | 3.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Time Before Reduce (s)  | 0.0  | 35.0  | 35.0  | 0.0  | 35.0  | 35.0  | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Time To Reduce (s)      | 0.0  | 1.0   | 1.0   | 0.0  | 1.0   | 1.0   | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 24.0  | 24.0  |      | 30.0  | 30.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) | 0    | 0     |       | 0    | 0     |       |      |      |      |      |      |      |
| Act Effect Green (s)    | 20.6 | 85.0  | 85.0  | 11.0 | 75.4  | 75.4  |      | 12.6 | 12.6 | 13.9 | 13.9 | 13.9 |
| Actuated g/C Ratio      | 0.15 | 0.61  | 0.61  | 0.08 | 0.54  | 0.54  |      | 0.09 | 0.09 | 0.10 | 0.10 | 0.10 |
| v/c Ratio               | 0.69 | 0.57  | 0.01  | 0.45 | 0.94  | 0.11  |      | 0.34 | 0.23 | 0.54 | 0.54 | 0.37 |
| Control Delay           | 71.1 | 17.8  | 0.0   | 83.9 | 12.7  | 0.1   |      | 65.6 | 1.5  | 72.5 | 72.1 | 3.0  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 71.1 | 17.8  | 0.0   | 83.9 | 12.7  | 0.1   |      | 65.6 | 1.5  | 72.5 | 72.1 | 3.0  |
| LOS                     | E    | B     | A     | F    | B     | A     |      | E    | A    | E    | E    | A    |
| Approach Delay          |      | 23.0  |       |      | 15.6  |       |      | 27.2 |      |      | 43.0 |      |
| Approach LOS            |      | C     |       |      | B     |       |      | C    |      |      | D    |      |

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 119 (85%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 20.5

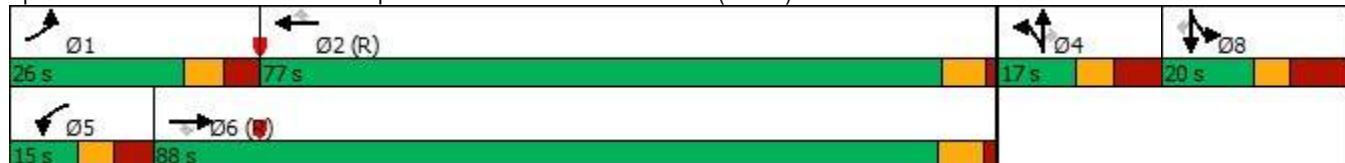
Intersection LOS: C

Intersection Capacity Utilization 72.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology supports speed limit in the range of 25 to 55 mph.



### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6250  | 6122  | 6294  | 6117  | 6229  | 6149  | 6196  |
| Vehs Exited             | 6249  | 6120  | 6357  | 6154  | 6235  | 6161  | 6215  |
| Starting Vehs           | 183   | 181   | 228   | 190   | 196   | 218   | 201   |
| Ending Vehs             | 184   | 183   | 165   | 153   | 190   | 206   | 182   |
| Travel Distance (mi)    | 5245  | 5097  | 5191  | 5120  | 5187  | 5109  | 5198  |
| Travel Time (hr)        | 207.0 | 202.0 | 209.9 | 196.0 | 206.9 | 197.2 | 206.8 |
| Total Delay (hr)        | 80.1  | 78.7  | 83.8  | 72.3  | 81.3  | 73.7  | 81.0  |
| Total Stops             | 4629  | 4595  | 4756  | 4229  | 4586  | 4329  | 4560  |
| Fuel Used (gal)         | 194.2 | 187.3 | 195.1 | 186.8 | 193.2 | 188.0 | 192.5 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 7:45  | 7:45  | 7:45  | 7:45  |
| End Time                | 9:00  | 9:00  | 9:00  | 9:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6091  | 6116  | 6238  | 6179  |
| Vehs Exited             | 6058  | 6133  | 6314  | 6200  |
| Starting Vehs           | 193   | 207   | 265   | 202   |
| Ending Vehs             | 226   | 190   | 189   | 182   |
| Travel Distance (mi)    | 5064  | 5122  | 5234  | 5157  |
| Travel Time (hr)        | 204.7 | 201.5 | 207.4 | 203.9 |
| Total Delay (hr)        | 82.1  | 77.7  | 81.0  | 79.2  |
| Total Stops             | 4771  | 4325  | 4559  | 4532  |
| Fuel Used (gal)         | 186.9 | 189.3 | 194.0 | 190.7 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 7:45 |
| End Time                            | 8:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

**Interval #1 Information Int 1**

Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1551 | 1486 | 1605 | 1438 | 1487 | 1376 | 1498 |
| Vehs Exited          | 1543 | 1443 | 1646 | 1462 | 1505 | 1419 | 1491 |
| Starting Vehs        | 183  | 181  | 228  | 190  | 196  | 218  | 201  |
| Ending Vehs          | 191  | 224  | 187  | 166  | 178  | 175  | 208  |
| Travel Distance (mi) | 1302 | 1219 | 1330 | 1213 | 1231 | 1171 | 1273 |
| Travel Time (hr)     | 50.6 | 48.4 | 53.1 | 45.8 | 46.4 | 43.2 | 50.3 |
| Total Delay (hr)     | 19.1 | 18.9 | 20.8 | 16.6 | 16.6 | 15.1 | 19.4 |
| Total Stops          | 1120 | 1103 | 1144 | 995  | 1027 | 907  | 1112 |
| Fuel Used (gal)      | 47.4 | 44.6 | 50.4 | 44.6 | 45.1 | 42.2 | 46.9 |

**Interval #1 Information Int 1**

Start Time 8:00

End Time 8:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1482 | 1535 | 1506 | 1493 |
| Vehs Exited          | 1495 | 1529 | 1577 | 1511 |
| Starting Vehs        | 193  | 207  | 265  | 202  |
| Ending Vehs          | 180  | 213  | 194  | 190  |
| Travel Distance (mi) | 1251 | 1281 | 1294 | 1256 |
| Travel Time (hr)     | 47.9 | 53.0 | 51.2 | 49.0 |
| Total Delay (hr)     | 17.6 | 21.9 | 20.1 | 18.6 |
| Total Stops          | 1024 | 1113 | 1090 | 1061 |
| Fuel Used (gal)      | 45.7 | 47.7 | 48.2 | 46.3 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1730 | 1663 | 1662 | 1697 | 1706 | 1731 | 1632 |
| Vehs Exited          | 1697 | 1647 | 1643 | 1659 | 1659 | 1650 | 1652 |
| Starting Vehs        | 191  | 224  | 187  | 166  | 178  | 175  | 208  |
| Ending Vehs          | 224  | 240  | 206  | 204  | 225  | 256  | 188  |
| Travel Distance (mi) | 1403 | 1365 | 1367 | 1407 | 1402 | 1381 | 1351 |
| Travel Time (hr)     | 55.8 | 55.7 | 57.4 | 55.9 | 58.0 | 54.6 | 57.0 |
| Total Delay (hr)     | 21.9 | 22.7 | 24.2 | 22.0 | 24.1 | 21.1 | 24.3 |
| Total Stops          | 1264 | 1324 | 1364 | 1217 | 1278 | 1245 | 1341 |
| Fuel Used (gal)      | 52.3 | 51.0 | 51.9 | 51.9 | 52.6 | 50.9 | 50.9 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 8:15 |
| End Time         | 8:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1637 | 1674 | 1648 | 1677 |
| Vehs Exited          | 1653 | 1685 | 1627 | 1656 |
| Starting Vehs        | 180  | 213  | 194  | 190  |
| Ending Vehs          | 164  | 202  | 215  | 209  |
| Travel Distance (mi) | 1364 | 1380 | 1370 | 1379 |
| Travel Time (hr)     | 60.2 | 54.8 | 53.6 | 56.3 |
| Total Delay (hr)     | 27.3 | 21.6 | 20.5 | 23.0 |
| Total Stops          | 1495 | 1228 | 1209 | 1293 |
| Fuel Used (gal)      | 51.7 | 51.2 | 49.9 | 51.4 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1485 | 1480 | 1484 | 1498 | 1487 | 1512 | 1491 |
| Vehs Exited          | 1514 | 1534 | 1466 | 1523 | 1502 | 1581 | 1487 |
| Starting Vehs        | 224  | 240  | 206  | 204  | 225  | 256  | 188  |
| Ending Vehs          | 195  | 186  | 224  | 179  | 210  | 187  | 192  |
| Travel Distance (mi) | 1271 | 1263 | 1214 | 1274 | 1270 | 1265 | 1267 |
| Travel Time (hr)     | 49.8 | 51.9 | 48.5 | 48.5 | 50.7 | 50.1 | 49.0 |
| Total Delay (hr)     | 19.2 | 21.2 | 19.0 | 17.9 | 19.9 | 19.5 | 18.4 |
| Total Stops          | 1061 | 1175 | 1064 | 1053 | 1099 | 1134 | 1040 |
| Fuel Used (gal)      | 47.2 | 47.0 | 45.4 | 46.1 | 47.7 | 47.2 | 46.5 |

**Interval #3 Information Int 3**

Start Time 8:30

End Time 8:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1418 | 1452 | 1512 | 1479 |
| Vehs Exited          | 1389 | 1457 | 1540 | 1501 |
| Starting Vehs        | 164  | 202  | 215  | 209  |
| Ending Vehs          | 193  | 197  | 187  | 195  |
| Travel Distance (mi) | 1161 | 1235 | 1282 | 1250 |
| Travel Time (hr)     | 46.9 | 47.2 | 51.2 | 49.4 |
| Total Delay (hr)     | 18.6 | 17.3 | 20.4 | 19.1 |
| Total Stops          | 1120 | 982  | 1122 | 1085 |
| Fuel Used (gal)      | 42.9 | 45.5 | 48.0 | 46.3 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1484 | 1493 | 1543 | 1484 | 1549 | 1530 | 1575 |
| Vehs Exited          | 1495 | 1496 | 1602 | 1510 | 1569 | 1511 | 1585 |
| Starting Vehs        | 195  | 186  | 224  | 179  | 210  | 187  | 192  |
| Ending Vehs          | 184  | 183  | 165  | 153  | 190  | 206  | 182  |
| Travel Distance (mi) | 1270 | 1250 | 1281 | 1226 | 1284 | 1292 | 1307 |
| Travel Time (hr)     | 50.8 | 46.0 | 50.9 | 45.7 | 51.9 | 49.3 | 50.5 |
| Total Delay (hr)     | 20.0 | 15.9 | 19.8 | 15.9 | 20.7 | 18.0 | 18.9 |
| Total Stops          | 1184 | 993  | 1184 | 964  | 1182 | 1043 | 1067 |
| Fuel Used (gal)      | 47.3 | 44.7 | 47.4 | 44.2 | 47.8 | 47.6 | 48.2 |

**Interval #4 Information Int 4**

Start Time 8:45

End Time 9:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1554 | 1455 | 1572 | 1521 |
| Vehs Exited          | 1521 | 1462 | 1570 | 1531 |
| Starting Vehs        | 193  | 197  | 187  | 195  |
| Ending Vehs          | 226  | 190  | 189  | 182  |
| Travel Distance (mi) | 1288 | 1225 | 1288 | 1271 |
| Travel Time (hr)     | 49.7 | 46.5 | 51.4 | 49.3 |
| Total Delay (hr)     | 18.6 | 16.8 | 20.1 | 18.5 |
| Total Stops          | 1132 | 1002 | 1138 | 1088 |
| Fuel Used (gal)      | 46.6 | 44.9 | 47.9 | 46.7 |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | WB  | NB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L   |    |
| Maximum Queue (ft)    | 95  | 74  | 232 | 232 | 218 | 37  | 340 | 528  | 565  | 563  | 68   | 123 |    |
| Average Queue (ft)    | 40  | 27  | 159 | 156 | 126 | 5   | 127 | 220  | 250  | 261  | 27   | 33  |    |
| 95th Queue (ft)       | 77  | 64  | 218 | 219 | 201 | 22  | 239 | 434  | 468  | 481  | 57   | 92  |    |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |     |    |
| Upstream Blk Time (%) |     |     | 1   | 1   | 0   |     |     |      |      |      |      |     |    |
| Queuing Penalty (veh) |     |     | 3   | 3   | 1   |     |     |      |      |      |      |     |    |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      |     | 80 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      | 1    |      |     | 0  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      | 1    |      |     | 1  |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 168 | 172 | 221  | 223  | 126 |
| Average Queue (ft)    | 75  | 74  | 122  | 118  | 41  |
| 95th Queue (ft)       | 136 | 140 | 209  | 215  | 86  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) | 0   | 0   |      |      |     |
| Queuing Penalty (veh) | 0   | 0   |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 15  | 0   |      | 1    |     |
| Queuing Penalty (veh) | 40  | 0   |      | 1    |     |

Intersection: 2: Commerce Pkwy & Driveway 2

| Movement              | EB  | NB  | SB  |
|-----------------------|-----|-----|-----|
| Directions Served     | LR  | LT  | TR  |
| Maximum Queue (ft)    | 146 | 29  | 2   |
| Average Queue (ft)    | 64  | 2   | 0   |
| 95th Queue (ft)       | 111 | 15  | 2   |
| Link Distance (ft)    | 156 | 924 | 206 |
| Upstream Blk Time (%) | 0   |     |     |
| Queuing Penalty (veh) | 0   |     |     |
| Storage Bay Dist (ft) |     |     |     |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

Queuing and Blocking Report  
Baseline

2022 Mitigated - AM  
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Intersection: 3: Driveway 1 & Warrenton Road (US 17)

| Movement              | EB | EB | EB | EB | WB  | WB  | WB  |
|-----------------------|----|----|----|----|-----|-----|-----|
| Directions Served     | T  | T  | T  | TR | T   | T   | T   |
| Maximum Queue (ft)    | 6  | 8  | 5  | 11 | 25  | 14  | 47  |
| Average Queue (ft)    | 0  | 0  | 0  | 0  | 1   | 0   | 2   |
| 95th Queue (ft)       | 4  | 4  | 3  | 8  | 19  | 8   | 38  |
| Link Distance (ft)    | 75 | 75 | 75 | 75 | 208 | 208 | 208 |
| Upstream Blk Time (%) |    |    |    |    |     |     |     |
| Queuing Penalty (veh) |    |    |    |    |     |     |     |
| Storage Bay Dist (ft) |    |    |    |    |     |     |     |
| Storage Blk Time (%)  |    |    |    |    |     |     |     |
| Queuing Penalty (veh) |    |    |    |    |     |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | WB  | WB  | WB   | WB   | WB   | WB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|------|------|------|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | L   | L   | T    | T    | T    | R   | LT  | R   |
| Maximum Queue (ft)    | 140 | 430  | 447  | 446  | 6   | 42  | 338  | 308  | 243  | 11  | 8   | 32  |
| Average Queue (ft)    | 27  | 31   | 34   | 41   | 0   | 7   | 146  | 113  | 78   | 0   | 0   | 7   |
| 95th Queue (ft)       | 104 | 222  | 231  | 233  | 3   | 27  | 303  | 262  | 194  | 5   | 5   | 25  |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |     |     | 1184 | 1184 | 1184 |     | 680 | 680 |
| Upstream Blk Time (%) |     |      |      |      |     |     |      |      |      |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |      |      |      |     |     |     |
| Storage Bay Dist (ft) |     | 375  |      |      | 520 | 520 |      |      |      | 235 |     |     |
| Storage Blk Time (%)  |     |      | 1    |      | 2   |     |      |      |      | 0   |     |     |
| Queuing Penalty (veh) |     |      | 0    |      | 0   |     |      |      |      | 0   |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 8   | 104 | 48  | 53  |
| Average Queue (ft)    | 0   | 37  | 6   | 19  |
| 95th Queue (ft)       | 5   | 85  | 29  | 44  |
| Link Distance (ft)    |     | 833 |     |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 220 |     | 340 | 340 |
| Storage Blk Time (%)  |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |

Queuing and Blocking Report  
Baseline

2022 Mitigated - AM  
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Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 297 | 348  | 323  | 269  | 27   | 95  | 149 | 351 | 289 | 212 | 27  | 106 |
| Average Queue (ft)    | 148 | 212  | 185  | 134  | 3    | 37  | 68  | 179 | 133 | 83  | 5   | 44  |
| 95th Queue (ft)       | 253 | 322  | 296  | 246  | 16   | 81  | 120 | 297 | 252 | 173 | 18  | 92  |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 335  |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  |     | 0    | 0    |      |      |     |     |     | 1   |     |     |     |
| Queuing Penalty (veh) |     | 0    | 0    |      |      |     |     |     | 1   |     |     |     |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|
| Directions Served     | R  | L   | LT  | R   |
| Maximum Queue (ft)    | 75 | 161 | 142 | 132 |
| Average Queue (ft)    | 34 | 74  | 65  | 51  |
| 95th Queue (ft)       | 64 | 129 | 123 | 110 |
| Link Distance (ft)    |    | 464 | 464 |     |
| Upstream Blk Time (%) |    |     |     |     |
| Queuing Penalty (veh) |    |     |     |     |
| Storage Bay Dist (ft) |    | 185 |     | 210 |
| Storage Blk Time (%)  |    |     | 0   |     |
| Queuing Penalty (veh) |    |     | 0   |     |

Network Summary

Network wide Queuing Penalty: 52

## Lanes, Volumes, Timings

2022 Mitigated - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group                 | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations        | ↑↑    | ↑↑↑↑  | ↑     | ↑     | ↑↑↑↑  | ↑     | ↑↑    | ↑↑    | ↑↑    | ↑↑    | ↑↑    | ↑↑    |
| Traffic Volume (vph)       | 148   | 1422  | 59    | 72    | 1560  | 232   | 62    | 53    | 271   | 223   | 54    | 134   |
| Future Volume (vph)        | 148   | 1422  | 59    | 72    | 1560  | 232   | 62    | 53    | 271   | 223   | 54    | 134   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |       | 1%    |       |       | -1%   |       |       | 2%    |       |       |
| Storage Length (ft)        | 0     | 0     | 425   |       | 0     | 80    |       | 215   | 0     |       | 256   |       |
| Storage Lanes              | 2     |       | 1     | 1     |       | 1     | 1     |       | 1     | 1     |       | 1     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 0.97  | 0.91  | 1.00  | 1.00  | 0.91  | 1.00  | 0.95  | 0.95  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.995 |       | 0.950 | 0.970 |       |
| Satd. Flow (prot)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1770  | 1591  | 1664  | 1699  | 1567  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       | 0.950 | 0.995 |       | 0.950 | 0.970 |       |
| Satd. Flow (perm)          | 3433  | 4590  | 1583  | 1761  | 4567  | 1575  | 1690  | 1770  | 1591  | 1664  | 1699  | 1567  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       | Yes   |       | Yes   |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 111   |       |       | 255   |       |       | 154   |       |       | 217   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 35    |       |       | 35    |       |       |
| Link Distance (ft)         | 274   |       |       | 2513  |       |       | 318   |       |       | 1466  |       |       |
| Travel Time (s)            | 4.2   |       |       | 38.1  |       |       | 6.2   |       |       | 28.6  |       |       |
| Peak Hour Factor           | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 163   | 1563  | 65    | 79    | 1714  | 255   | 68    | 58    | 298   | 245   | 59    | 147   |
| Shared Lane Traffic (%)    |       |       |       |       |       | 10%   |       |       |       | 39%   |       |       |
| Lane Group Flow (vph)      | 163   | 1563  | 65    | 79    | 1714  | 255   | 61    | 65    | 298   | 149   | 155   | 147   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 17    |       |       | 24    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 1.00  | 1.00  | 1.00  | 1.01  | 1.01  | 1.01  | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | pm+ov | Prot  | NA    | pm+ov | Split | NA    | pm+ov | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     | 5     | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 4     | 5     | 2     | 8     | 4     | 4     | 5     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 5.0   | 5.0   | 12.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.5  | 41.0  | 14.7  | 13.6  | 43.0  | 14.7  | 14.7  | 14.7  | 13.6  | 14.7  | 14.7  | 14.7  |
| Total Split (s)            | 17.0  | 82.0  | 23.0  | 17.0  | 82.0  | 28.0  | 23.0  | 23.0  | 17.0  | 28.0  | 28.0  | 28.0  |
| Total Split (%)            | 11.3% | 54.7% | 15.3% | 11.3% | 54.7% | 18.7% | 15.3% | 15.3% | 11.3% | 18.7% | 18.7% | 18.7% |
| Maximum Green (s)          | 8.5   | 76.0  | 13.3  | 8.4   | 76.0  | 18.3  | 13.3  | 13.3  | 8.4   | 18.3  | 18.3  | 18.3  |
| Yellow Time (s)            | 3.9   | 4.8   | 4.1   | 3.8   | 4.6   | 4.1   | 4.1   | 4.1   | 3.8   | 4.1   | 4.1   | 4.1   |
| All-Red Time (s)           | 4.6   | 1.2   | 5.6   | 4.8   | 1.4   | 5.6   | 5.6   | 5.6   | 4.8   | 5.6   | 5.6   | 5.6   |
| Lost Time Adjust (s)       | -4.5  | -2.0  | -5.0  | -4.6  | -2.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.7   | 4.0   | 4.0   | 4.7   | 4.7   | 4.7   | 3.6   | 4.7   | 4.7   | 4.7   |
| Lead/Lag                   | Lag   | Lag   |       | Lead  | Lead  |       |       |       | Lead  |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

2022 Mitigated - PM

Synchro 10 Report

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## Lanes, Volumes, Timings

2022 Mitigated - PM

## 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)

08/31/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Recall Mode             | None | C-Max | None  | None | C-Max | None  | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   |       |      |       | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 11.0  |       |      |       | 11.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) |      | 0     |       |      |       | 0     |      |      |      |      |      |      |
| Act Effect Green (s)    | 13.0 | 81.6  | 101.2 | 13.3 | 81.9  | 108.0 | 15.6 | 15.6 | 30.4 | 22.1 | 22.1 | 22.1 |
| Actuated g/C Ratio      | 0.09 | 0.54  | 0.67  | 0.09 | 0.55  | 0.72  | 0.10 | 0.10 | 0.20 | 0.15 | 0.15 | 0.15 |
| v/c Ratio               | 0.55 | 0.63  | 0.06  | 0.51 | 0.69  | 0.21  | 0.35 | 0.36 | 0.67 | 0.61 | 0.62 | 0.35 |
| Control Delay           | 56.1 | 9.7   | 0.1   | 63.2 | 21.4  | 0.5   | 67.4 | 67.4 | 23.6 | 70.7 | 71.1 | 2.8  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 56.1 | 9.7   | 0.1   | 63.2 | 21.4  | 0.5   | 67.4 | 67.4 | 23.6 | 70.7 | 71.1 | 2.8  |
| LOS                     | E    | A     | A     | E    | C     | A     | E    | E    | C    | E    | E    | A    |
| Approach Delay          |      | 13.6  |       |      |       | 20.4  |      |      | 36.6 |      |      | 48.7 |
| Approach LOS            |      | B     |       |      |       | C     |      |      | D    |      |      | D    |

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 49 (33%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 22.0

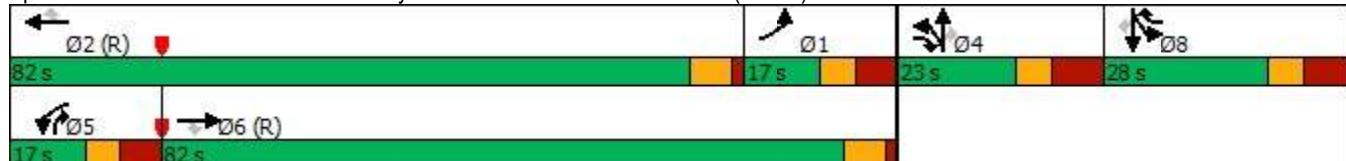
Intersection LOS: C

Intersection Capacity Utilization 62.4%

ICU Level of Service B

Analysis Period (min) 15

## Splits and Phases: 1: Commerce Pkwy/Plantation Dr &amp; Warrenton Road (US 17)



HCM 6th Signalized Intersection Summary  
1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

2022 Mitigated - PM

08/31/2020

| Movement   | EBL   | EBT  | EBR  | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--|-------|------|------|------|-------|-------|------|------|------|------|------|------|
| Lane Configurations  | ↑↑    | ↑↑↑↑ | ↑    | ↑    | ↑↑↑↑  | ↑     | ↑↑   | ↑↑   | ↑    | ↑↑   | ↑↑   | ↑    |
| Traffic Volume (veh/h)   | 148   | 1422 | 59   | 72   | 1560  | 232   | 62   | 53   | 271  | 223  | 54   | 134  |
| Future Volume (veh/h)  | 148   | 1422 | 59   | 72   | 1560  | 232   | 62   | 53   | 271  | 223  | 54   | 134  |
| Initial Q (Q <sub>b</sub> ), veh   | 0     | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)  | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj   | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach  | No    |      | No   |      | No    |       | No   |      | No   |      | No   |      |
| Adj Sat Flow, veh/h/ln   | 1870  | 1707 | 1870 | 1864 | 1701  | 1864  | 1909 | 1909 | 1909 | 1847 | 1847 | 1847 |
| Adj Flow Rate, veh/h   | 163   | 1563 | 65   | 79   | 1714  | 255   | 63   | 65   | 298  | 152  | 189  | 147  |
| Peak Hour Factor   | 0.91  | 0.91 | 0.91 | 0.91 | 0.91  | 0.91  | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, %   | 2     | 13   | 2    | 2    | 13    | 2     | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h   | 1534  | 4021 | 1592 | 150  | 2415  | 1092  | 222  | 233  | 339  | 266  | 279  | 237  |
| Arrive On Green  | 0.44  | 0.86 | 0.88 | 0.08 | 0.52  | 0.54  | 0.12 | 0.12 | 0.12 | 0.15 | 0.15 | 0.15 |
| Sat Flow, veh/h  | 3456  | 4661 | 1585 | 1776 | 4645  | 1580  | 1818 | 1909 | 1618 | 1759 | 1847 | 1565 |
| Grp Volume(v), veh/h   | 163   | 1563 | 65   | 79   | 1714  | 255   | 63   | 65   | 298  | 152  | 189  | 147  |
| Grp Sat Flow(s), veh/h/ln  | 1728  | 1554 | 1585 | 1776 | 1548  | 1580  | 1818 | 1909 | 1618 | 1759 | 1847 | 1565 |
| Q Serve(g_s), s  | 4.1   | 10.4 | 0.0  | 6.4  | 42.1  | 8.9   | 4.7  | 4.6  | 18.3 | 12.0 | 14.5 | 13.2 |
| Cycle Q Clear(g_c), s  | 4.1   | 10.4 | 0.0  | 6.4  | 42.1  | 8.9   | 4.7  | 4.6  | 18.3 | 12.0 | 14.5 | 13.2 |
| Prop In Lane   | 1.00  |      | 1.00 | 1.00 |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h   | 1534  | 4021 | 1592 | 150  | 2415  | 1092  | 222  | 233  | 339  | 266  | 279  | 237  |
| V/C Ratio(X)   | 0.11  | 0.39 | 0.04 | 0.53 | 0.71  | 0.23  | 0.28 | 0.28 | 0.88 | 0.57 | 0.68 | 0.62 |
| Avail Cap(c_a), veh/h  | 1534  | 4021 | 1592 | 154  | 2415  | 1092  | 222  | 233  | 339  | 273  | 287  | 243  |
| HCM Platoon Ratio  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)   | 1.00  | 1.00 | 1.00 | 0.72 | 0.72  | 0.72  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh   | 24.3  | 2.1  | 0.0  | 65.8 | 27.4  | 8.5   | 59.9 | 59.9 | 57.5 | 59.1 | 60.2 | 59.6 |
| Incr Delay (d2), s/veh   | 0.0   | 0.3  | 0.0  | 2.2  | 1.3   | 0.4   | 0.7  | 0.6  | 22.4 | 2.7  | 6.0  | 4.6  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%), veh/ln  | 1.7   | 1.8  | 0.1  | 3.0  | 15.2  | 4.8   | 2.2  | 2.3  | 13.0 | 5.6  | 7.3  | 5.5  |
| Unsig. Movement Delay, s/veh   |       |      |      |      |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh  | 24.4  | 2.4  | 0.0  | 68.0 | 28.7  | 8.9   | 60.6 | 60.5 | 79.9 | 61.9 | 66.2 | 64.3 |
| LnGrp LOS  | C     | A    | A    | E    | C     | A     | E    | E    | E    | E    | E    | E    |
| Approach Vol, veh/h  | 1791  |      |      |      | 2048  |       |      |      | 426  |      |      | 488  |
| Approach Delay, s/veh  | 4.3   |      |      |      | 27.7  |       |      |      | 74.1 |      |      | 64.3 |
| Approach LOS   | A     |      |      |      | C     |       |      |      | E    |      |      | E    |
| Timer - Assigned Phs   | 1     | 2    |      | 4    | 5     | 6     |      |      | 8    |      |      |      |
| Phs Duration (G+Y+Rc), s   | 72.1  | 82.0 |      | 23.0 | 16.7  | 137.5 |      |      | 27.4 |      |      |      |
| Change Period (Y+Rc), s  | * 8.5 | 6.0  |      | 9.7  | * 8.6 | * 8.5 |      |      | 9.7  |      |      |      |
| Max Green Setting (Gmax), s  | * 8.5 | 76.0 |      | 13.3 | * 8.4 | * 76  |      |      | 18.3 |      |      |      |
| Max Q Clear Time (g_c+l1), s   | 6.1   | 44.1 |      | 20.3 | 8.4   | 12.4  |      |      | 17.5 |      |      |      |
| Green Ext Time (p_c), s  | 0.1   | 31.2 |      | 0.0  | 0.0   | 60.0  |      |      | 0.2  |      |      |      |
| Intersection Summary   |       |      |      |      |       |       |      |      |      |      |      |      |
| HCM 6th Ctrl Delay   |       |      |      | 26.8 |       |       |      |      |      |      |      |      |
| HCM 6th LOS  |       |      |      | C    |       |       |      |      |      |      |      |      |
| Notes  |       |      |      |      |       |       |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement.                               |       |      |      |      |       |       |      |      |      |      |      |      |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |      |       |       |      |      |      |      |      |      |

Lanes, Volumes, Timings  
2: Commerce Pkwy & Driveway 2

2022 Mitigated - PM

08/31/2020



| Lane Group                 | EBL   | EBR   | NBL  | NBT   | SBT   | SBR   |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations        |       |       |      |       |       |       |
| Traffic Volume (vph)       | 191   | 1     | 8    | 196   | 128   | 57    |
| Future Volume (vph)        | 191   | 1     | 8    | 196   | 128   | 57    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Grade (%)                  | 0%    |       |      | -1%   | 0%    |       |
| Lane Util. Factor          | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Frt                        | 0.999 |       |      |       | 0.958 |       |
| Flt Protected              | 0.953 |       |      | 0.998 |       |       |
| Satd. Flow (prot)          | 1773  | 0     | 0    | 1868  | 1785  | 0     |
| Flt Permitted              | 0.953 |       |      | 0.998 |       |       |
| Satd. Flow (perm)          | 1773  | 0     | 0    | 1868  | 1785  | 0     |
| Link Speed (mph)           | 30    |       |      | 35    | 35    |       |
| Link Distance (ft)         | 191   |       |      | 948   | 318   |       |
| Travel Time (s)            | 4.3   |       |      | 18.5  | 6.2   |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)            | 208   | 1     | 9    | 213   | 139   | 62    |
| Shared Lane Traffic (%)    |       |       |      |       |       |       |
| Lane Group Flow (vph)      | 209   | 0     | 0    | 222   | 201   | 0     |
| Enter Blocked Intersection | No    | No    | No   | No    | No    | No    |
| Lane Alignment             | Left  | Right | Left | Left  | Left  | Right |
| Median Width(ft)           | 12    |       |      | 12    | 12    |       |
| Link Offset(ft)            | 0     |       |      | 0     | 0     |       |
| Crosswalk Width(ft)        | 16    |       |      | 16    | 16    |       |
| Two way Left Turn Lane     |       |       |      | Yes   |       |       |
| Headway Factor             | 1.00  | 1.00  | 0.99 | 0.99  | 1.00  | 1.00  |
| Turning Speed (mph)        | 15    | 9     | 15   |       |       | 9     |
| Sign Control               | Stop  |       |      | Free  | Free  |       |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.1% ICU Level of Service A

Analysis Period (min) 15

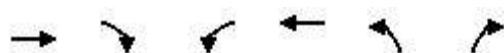
| Intersection             |        |        |       |        |      |      |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh         | 4.8    |        |       |        |      |      |
| Movement                 | EBL    | EBR    | NBL   | NBT    | SBT  | SBR  |
| Lane Configurations      |        |        |       |        |      |      |
| Traffic Vol, veh/h       | 191    | 1      | 8     | 196    | 128  | 57   |
| Future Vol, veh/h        | 191    | 1      | 8     | 196    | 128  | 57   |
| Conflicting Peds, #/hr   | 0      | 0      | 0     | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop   | Free  | Free   | Free | Free |
| RT Channelized           | -      | None   | -     | None   | -    | None |
| Storage Length           | 0      | -      | -     | -      | -    | -    |
| Veh in Median Storage, # | 0      | -      | -     | 0      | 0    | -    |
| Grade, %                 | 0      | -      | -     | -1     | 0    | -    |
| Peak Hour Factor         | 92     | 92     | 92    | 92     | 92   | 92   |
| Heavy Vehicles, %        | 2      | 2      | 2     | 2      | 2    | 2    |
| Mvmt Flow                | 208    | 1      | 9     | 213    | 139  | 62   |
| Major/Minor              | Minor2 | Major1 |       | Major2 |      |      |
| Conflicting Flow All     | 401    | 170    | 201   | 0      | -    | 0    |
| Stage 1                  | 170    | -      | -     | -      | -    | -    |
| Stage 2                  | 231    | -      | -     | -      | -    | -    |
| Critical Hdwy            | 6.42   | 6.22   | 4.12  | -      | -    | -    |
| Critical Hdwy Stg 1      | 5.42   | -      | -     | -      | -    | -    |
| Critical Hdwy Stg 2      | 5.42   | -      | -     | -      | -    | -    |
| Follow-up Hdwy           | 3.518  | 3.318  | 2.218 | -      | -    | -    |
| Pot Cap-1 Maneuver       | 605    | 874    | 1371  | -      | -    | -    |
| Stage 1                  | 860    | -      | -     | -      | -    | -    |
| Stage 2                  | 807    | -      | -     | -      | -    | -    |
| Platoon blocked, %       | -      | -      | -     | -      | -    | -    |
| Mov Cap-1 Maneuver       | 601    | 874    | 1371  | -      | -    | -    |
| Mov Cap-2 Maneuver       | 601    | -      | -     | -      | -    | -    |
| Stage 1                  | 854    | -      | -     | -      | -    | -    |
| Stage 2                  | 807    | -      | -     | -      | -    | -    |
| Approach                 | EB     | NB     |       | SB     |      |      |
| HCM Control Delay, s     | 14.1   | 0.3    |       | 0      |      |      |
| HCM LOS                  | B      |        |       |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1 | SBT    | SBR  |      |
| Capacity (veh/h)         | 1371   | -      | 602   | -      | -    |      |
| HCM Lane V/C Ratio       | 0.006  | -      | 0.347 | -      | -    |      |
| HCM Control Delay (s)    | 7.6    | -      | 14.1  | -      | -    |      |
| HCM Lane LOS             | A      | -      | B     | -      | -    |      |
| HCM 95th %tile Q(veh)    | 0      | -      | 1.5   | -      | -    |      |

## Lanes, Volumes, Timings

2022 Mitigated - PM

## 3: Driveway 1 &amp; Warrenton Road (US 17)

08/31/2020



| Lane Group                 | EBT   | EBR   | WBL  | WBT  | NBL  | NBR   |
|----------------------------|-------|-------|------|------|------|-------|
| Lane Configurations        | 6     | 1     | 1    | 4    | 1    | 1     |
| Traffic Volume (vph)       | 1629  | 127   | 0    | 1756 | 0    | 0     |
| Future Volume (vph)        | 1629  | 127   | 0    | 1756 | 0    | 0     |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900 | 1900 | 1900 | 1900  |
| Grade (%)                  | 0%    |       |      | 2%   | 0%   |       |
| Lane Util. Factor          | 0.76  | 0.76  | 1.00 | 0.86 | 1.00 | 1.00  |
| Frt                        | 0.989 |       |      |      |      |       |
| Flt Protected              |       |       |      |      |      |       |
| Satd. Flow (prot)          | 8401  | 0     | 0    | 6344 | 0    | 0     |
| Flt Permitted              |       |       |      |      |      |       |
| Satd. Flow (perm)          | 8401  | 0     | 0    | 6344 | 0    | 0     |
| Link Speed (mph)           | 45    |       |      | 45   | 30   |       |
| Link Distance (ft)         | 130   |       |      | 274  | 262  |       |
| Travel Time (s)            | 2.0   |       |      | 4.2  | 6.0  |       |
| Peak Hour Factor           | 0.92  | 0.92  | 0.92 | 0.92 | 0.92 | 0.92  |
| Adj. Flow (vph)            | 1771  | 138   | 0    | 1909 | 0    | 0     |
| Shared Lane Traffic (%)    |       |       |      |      |      |       |
| Lane Group Flow (vph)      | 1909  | 0     | 0    | 1909 | 0    | 0     |
| Enter Blocked Intersection | Yes   | Yes   | Yes  | Yes  | No   | No    |
| Lane Alignment             | Left  | Right | Left | Left | Left | Right |
| Median Width(ft)           | 5     |       |      | 5    | 0    |       |
| Link Offset(ft)            | 0     |       |      | 0    | 0    |       |
| Crosswalk Width(ft)        | 16    |       |      | 16   | 16   |       |
| Two way Left Turn Lane     |       |       |      |      |      |       |
| Headway Factor             | 1.00  | 1.00  | 1.01 | 1.01 | 1.00 | 1.00  |
| Turning Speed (mph)        |       | 9     | 15   |      | 15   | 9     |
| Sign Control               | Free  |       |      | Free | Stop |       |

## Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 28.8% ICU Level of Service A

Analysis Period (min) 15

## Lanes, Volumes, Timings

2022 Mitigated - PM

## 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | ↑     | ↑↑↑   | ↑     | ↑↑    | ↑↑↑   | ↑     | ↑     | ↑     | ↑↑↑   | ↑     | ↑↑    | ↑     |
| Traffic Volume (vph)       | 63    | 1859  | 12    | 61    | 1805  | 44    | 66    | 3     | 136   | 126   | 1     | 68    |
| Future Volume (vph)        | 63    | 1859  | 12    | 61    | 1805  | 44    | 66    | 3     | 136   | 126   | 1     | 68    |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       | 1%    |       |       |       | 3%    |       |       | 3%    |       |
| Storage Length (ft)        | 375   |       | 350   | 520   |       | 235   | 0     |       | 220   | 0     |       | 340   |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     |       | 1     | 1     |       | 2     |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.954 |       | 0.950 | 0.953 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1750  | 2745  | 1656  | 1661  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.954 |       | 0.950 | 0.953 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3416  | 4567  | 1575  | 0     | 1750  | 2745  | 1656  | 1661  | 1560  |
| Right Turn on Red          |       | Yes   |       |       | Yes   |       |       | Yes   |       |       | Yes   |       |
| Satd. Flow (RTOR)          |       | 161   |       |       | 164   |       |       | 216   |       |       | 207   |       |
| Link Speed (mph)           | 45    |       |       | 45    |       |       | 25    |       |       | 35    |       |       |
| Link Distance (ft)         | 2513  |       |       | 1244  |       |       | 756   |       |       | 930   |       |       |
| Travel Time (s)            | 38.1  |       |       | 18.8  |       |       | 20.6  |       |       | 18.1  |       |       |
| Peak Hour Factor           | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 68    | 1999  | 13    | 66    | 1941  | 47    | 71    | 3     | 146   | 135   | 1     | 73    |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       | 50%   |       |       |       |
| Lane Group Flow (vph)      | 68    | 1999  | 13    | 66    | 1941  | 47    | 0     | 74    | 146   | 67    | 69    | 73    |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |       |
| Link Offset(ft)            | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |       |
| Crosswalk Width(ft)        | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       | 6     |       |       | 2     | 2     |       |       | 4     |       | 8     | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 4.9   | 4.9   | 4.9   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)          | 13.7  | 39.6  | 39.6  | 13.3  | 34.9  | 34.9  | 14.0  | 14.0  | 14.0  | 14.1  | 14.1  | 14.1  |
| Total Split (s)            | 18.0  | 99.0  | 99.0  | 14.0  | 95.0  | 95.0  | 18.0  | 18.0  | 18.0  | 19.0  | 19.0  | 19.0  |
| Total Split (%)            | 12.0% | 66.0% | 66.0% | 9.3%  | 63.3% | 63.3% | 12.0% | 12.0% | 12.0% | 12.7% | 12.7% | 12.7% |
| Maximum Green (s)          | 9.3   | 92.4  | 92.4  | 5.7   | 89.1  | 89.1  | 10.2  | 10.2  | 10.2  | 9.9   | 9.9   | 9.9   |
| Yellow Time (s)            | 4.1   | 5.1   | 5.1   | 3.8   | 4.7   | 4.7   | 3.0   | 3.0   | 3.0   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 4.6   | 1.5   | 1.5   | 4.5   | 1.2   | 1.2   | 4.8   | 4.8   | 4.8   | 5.2   | 5.2   | 5.2   |
| Lost Time Adjust (s)       | -4.7  | -2.6  | -2.6  | -4.3  | -1.9  | -1.9  |       | -3.8  | -3.8  | -5.0  | -5.0  | -5.0  |
| Total Lost Time (s)        | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |       | 4.0   | 4.0   | 4.1   | 4.1   | 4.1   |
| Lead/Lag                   | Lead  | Lead  | Lead  | Lag   | Lag   | Lag   |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 5.0   | 5.0   | 3.0   | 5.0   | 5.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

2022 Mitigated - PM

Synchro 10 Report

## Lanes, Volumes, Timings

2022 Mitigated - PM

## 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)

08/31/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Minimum Gap (s)         | 3.0  | 4.0   | 4.0   | 3.0  | 4.0   | 4.0   | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Time Before Reduce (s)  | 0.0  | 35.0  | 35.0  | 0.0  | 35.0  | 35.0  | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| Time To Reduce (s)      | 0.0  | 1.0   | 1.0   | 0.0  | 1.0   | 1.0   | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 26.0  | 26.0  |      | 22.0  | 22.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) | 0    | 0     |       | 0    | 0     |       |      |      |      |      |      |      |
| Act Effect Green (s)    | 13.5 | 99.6  | 99.6  | 10.0 | 96.4  | 96.4  |      | 13.3 | 13.3 | 13.8 | 13.8 | 13.8 |
| Actuated g/C Ratio      | 0.09 | 0.66  | 0.66  | 0.07 | 0.64  | 0.64  |      | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 |
| v/c Ratio               | 0.43 | 0.65  | 0.01  | 0.29 | 0.66  | 0.04  |      | 0.48 | 0.33 | 0.44 | 0.45 | 0.22 |
| Control Delay           | 71.9 | 18.3  | 0.0   | 70.2 | 19.3  | 0.1   |      | 75.4 | 2.5  | 73.6 | 74.2 | 1.5  |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 71.9 | 18.3  | 0.0   | 70.2 | 19.3  | 0.1   |      | 75.4 | 2.5  | 73.6 | 74.2 | 1.5  |
| LOS                     | E    | B     | A     | E    | B     | A     |      | E    | A    | E    | E    | A    |
| Approach Delay          |      | 19.9  |       |      | 20.5  |       |      | 27.0 |      |      | 48.6 |      |
| Approach LOS            |      | B     |       |      | C     |       |      | C    |      |      | D    |      |

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 114 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 21.8

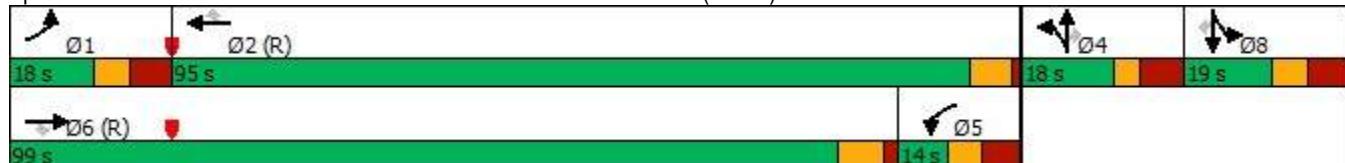
Intersection LOS: C

Intersection Capacity Utilization 60.6%

ICU Level of Service B

Analysis Period (min) 15

## Splits and Phases: 9: Commuter Lot/Falls Run Dr &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

## Lanes, Volumes, Timings

2022 Mitigated - PM

16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)

08/31/2020

|                            | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations        | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| Traffic Volume (vph)       | 203   | 1525  | 35    | 71    | 1655  | 94    | 22    | 85    | 196   | 93    | 28    | 148   |
| Future Volume (vph)        | 203   | 1525  | 35    | 71    | 1655  | 94    | 22    | 85    | 196   | 93    | 28    | 148   |
| Ideal Flow (vphpl)         | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)                  | -1%   |       |       | 2%    |       |       | 3%    |       |       | 3%    |       |       |
| Storage Length (ft)        | 335   |       | 0     | 315   |       | 0     | 0     | 185   | 0     |       | 210   |       |
| Storage Lanes              | 1     |       | 1     | 2     |       | 1     | 0     | 1     | 1     |       | 1     |       |
| Taper Length (ft)          | 50    |       |       | 50    |       |       | 50    |       |       | 50    |       |       |
| Lane Util. Factor          | 1.00  | 0.91  | 1.00  | 0.97  | 0.91  | 1.00  | 1.00  | 1.00  | 1.00  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>            |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |       |       | 0.850 |
| Flt Protected              | 0.950 |       |       | 0.950 |       |       |       | 0.990 |       | 0.950 | 0.973 |       |
| Satd. Flow (prot)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1816  | 1560  | 1656  | 1696  | 1560  |
| Flt Permitted              | 0.950 |       |       | 0.950 |       |       |       | 0.990 |       | 0.950 | 0.973 |       |
| Satd. Flow (perm)          | 1778  | 4613  | 1591  | 3399  | 4544  | 1567  | 0     | 1816  | 1560  | 1656  | 1696  | 1560  |
| Right Turn on Red          |       |       | Yes   |       |       | Yes   |       |       | Yes   |       | Yes   |       |
| Satd. Flow (RTOR)          |       |       | 177   |       |       | 224   |       |       | 202   |       |       | 191   |
| Link Speed (mph)           |       | 45    |       |       | 45    |       |       | 20    |       |       | 35    |       |
| Link Distance (ft)         |       | 1132  |       |       | 824   |       |       | 772   |       |       | 571   |       |
| Travel Time (s)            |       | 17.2  |       |       | 12.5  |       |       | 26.3  |       |       | 11.1  |       |
| Peak Hour Factor           | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Heavy Vehicles (%)         | 2%    | 13%   | 2%    | 2%    | 13%   | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    | 2%    |
| Adj. Flow (vph)            | 218   | 1640  | 38    | 76    | 1780  | 101   | 24    | 91    | 211   | 100   | 30    | 159   |
| Shared Lane Traffic (%)    |       |       |       |       |       |       |       |       |       | 36%   |       |       |
| Lane Group Flow (vph)      | 218   | 1640  | 38    | 76    | 1780  | 101   | 0     | 115   | 211   | 64    | 66    | 159   |
| Enter Blocked Intersection | No    |
| Lane Alignment             | Left  | Left  | Right |
| Median Width(ft)           |       | 24    |       |       | 24    |       |       | 12    |       |       | 12    |       |
| Link Offset(ft)            |       | 0     |       |       | 0     |       |       | 0     |       |       | 0     |       |
| Crosswalk Width(ft)        |       | 16    |       |       | 16    |       |       | 16    |       |       | 16    |       |
| Two way Left Turn Lane     |       |       |       |       |       |       |       |       |       |       |       |       |
| Headway Factor             | 0.99  | 0.99  | 0.99  | 1.01  | 1.01  | 1.01  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  | 1.02  |
| Turning Speed (mph)        | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     | 15    |       | 9     |
| Turn Type                  | Prot  | NA    | Perm  | Prot  | NA    | Perm  | Split | NA    | Perm  | Split | NA    | Perm  |
| Protected Phases           | 1     | 6     |       | 5     | 2     |       | 4     | 4     |       | 8     | 8     |       |
| Permitted Phases           |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phase             | 1     | 6     | 6     | 5     | 2     | 2     | 4     | 4     | 4     | 8     | 8     | 8     |
| Switch Phase               |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)        | 5.0   | 12.0  | 12.0  | 5.0   | 12.0  | 12.0  | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)          | 12.8  | 37.4  | 37.4  | 12.9  | 43.0  | 43.0  | 15.0  | 15.0  | 15.0  | 16.5  | 16.5  | 16.5  |
| Total Split (s)            | 32.0  | 91.9  | 91.9  | 15.1  | 75.0  | 75.0  | 22.0  | 22.0  | 22.0  | 21.0  | 21.0  | 21.0  |
| Total Split (%)            | 21.3% | 61.3% | 61.3% | 10.1% | 50.0% | 50.0% | 14.7% | 14.7% | 14.7% | 14.0% | 14.0% | 14.0% |
| Maximum Green (s)          | 24.2  | 85.5  | 85.5  | 7.2   | 69.0  | 69.0  | 13.0  | 13.0  | 13.0  | 10.5  | 10.5  | 10.5  |
| Yellow Time (s)            | 4.0   | 4.9   | 4.9   | 3.8   | 4.7   | 4.7   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   | 3.9   |
| All-Red Time (s)           | 3.8   | 1.5   | 1.5   | 4.1   | 1.3   | 1.3   | 5.1   | 5.1   | 5.1   | 6.6   | 6.6   | 6.6   |
| Lost Time Adjust (s)       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)        | 7.8   | 6.4   | 6.4   | 7.9   | 6.0   | 6.0   |       | 9.0   | 9.0   | 10.5  | 10.5  | 10.5  |
| Lead/Lag                   | Lag   | Lead  | Lead  | Lag   | Lead  | Lead  |       |       |       |       |       |       |
| Lead-Lag Optimize?         |       |       |       |       |       |       |       |       |       |       |       |       |
| Vehicle Extension (s)      | 3.0   | 5.0   | 5.0   | 4.0   | 5.0   | 5.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |

2022 Mitigated - PM

Synchro 10 Report

ER

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## Lanes, Volumes, Timings

2022 Mitigated - PM

16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)

08/31/2020



| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|------|
| Minimum Gap (s)         | 3.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Time Before Reduce (s)  | 0.0  | 35.0  | 35.0  | 0.0  | 35.0  | 35.0  | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Time To Reduce (s)      | 0.0  | 1.0   | 1.0   | 0.0  | 1.0   | 1.0   | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| Recall Mode             | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s)           |      | 7.0   | 7.0   |      | 7.0   | 7.0   |      |      |      |      |      |      |
| Flash Dont Walk (s)     |      | 24.0  | 24.0  |      | 30.0  | 30.0  |      |      |      |      |      |      |
| Pedestrian Calls (#/hr) | 0    | 0     |       | 0    | 0     |       |      |      |      |      |      |      |
| Act Effect Green (s)    | 24.2 | 87.6  | 87.6  | 7.2  | 71.1  | 71.1  |      | 12.4 | 12.4 | 9.0  | 9.0  | 9.0  |
| Actuated g/C Ratio      | 0.16 | 0.58  | 0.58  | 0.05 | 0.47  | 0.47  |      | 0.08 | 0.08 | 0.06 | 0.06 | 0.06 |
| v/c Ratio               | 0.76 | 0.61  | 0.04  | 0.47 | 0.83  | 0.12  |      | 0.77 | 0.67 | 0.65 | 0.65 | 0.58 |
| Control Delay           | 77.9 | 21.7  | 0.1   | 57.3 | 18.0  | 0.5   |      | 97.8 | 20.7 | 97.3 | 97.3 | 12.8 |
| Queue Delay             | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 77.9 | 21.7  | 0.1   | 57.3 | 18.0  | 0.5   |      | 97.8 | 20.7 | 97.3 | 97.3 | 12.8 |
| LOS                     | E    | C     | A     | E    | B     | A     |      | F    | C    | F    | F    | B    |
| Approach Delay          |      | 27.7  |       |      | 18.6  |       |      | 47.9 |      |      | 50.8 |      |
| Approach LOS            |      | C     |       |      | B     |       |      | D    |      |      | D    |      |

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 30 (20%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 26.7

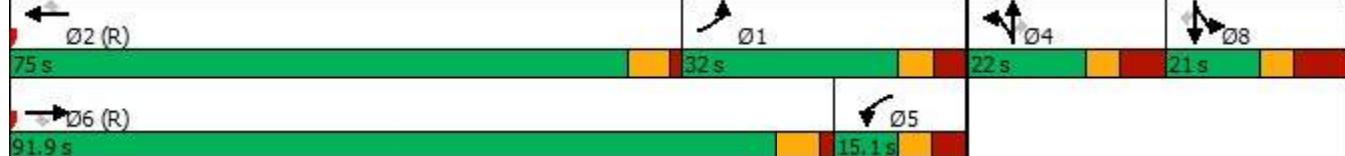
Intersection LOS: C

Intersection Capacity Utilization 74.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 16: McWhirt Loop/Lichfield Blvd &amp; Warrenton Road (US 17)



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HCM 6th Edition methodology supports speed limit in the range of 25 to 55 mph.



### Summary of All Intervals

| Run Number              | 1     | 10    | 2     | 3     | 4     | 5     | 6     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6108  | 6111  | 6280  | 6253  | 6118  | 6052  | 5953  |
| Vehs Exited             | 6096  | 6126  | 6303  | 6272  | 6102  | 6062  | 5987  |
| Starting Vehs           | 213   | 202   | 223   | 211   | 199   | 211   | 200   |
| Ending Vehs             | 225   | 187   | 200   | 192   | 215   | 201   | 166   |
| Travel Distance (mi)    | 4898  | 4958  | 5081  | 5091  | 4992  | 4946  | 4840  |
| Travel Time (hr)        | 212.7 | 211.3 | 221.3 | 221.8 | 215.0 | 214.7 | 205.1 |
| Total Delay (hr)        | 90.1  | 87.5  | 94.1  | 94.9  | 90.3  | 91.0  | 84.2  |
| Total Stops             | 5556  | 5417  | 5660  | 5719  | 5547  | 5536  | 5261  |
| Fuel Used (gal)         | 191.8 | 191.6 | 199.0 | 198.2 | 193.3 | 192.5 | 186.7 |

### Summary of All Intervals

| Run Number              | 7     | 8     | 9     | Avg   |
|-------------------------|-------|-------|-------|-------|
| Start Time              | 4:45  | 4:45  | 4:45  | 4:45  |
| End Time                | 6:00  | 6:00  | 6:00  | 6:00  |
| Total Time (min)        | 75    | 75    | 75    | 75    |
| Time Recorded (min)     | 60    | 60    | 60    | 60    |
| # of Intervals          | 5     | 5     | 5     | 5     |
| # of Recorded Intervals | 4     | 4     | 4     | 4     |
| Vehs Entered            | 6118  | 6115  | 6260  | 6136  |
| Vehs Exited             | 6128  | 6142  | 6263  | 6148  |
| Starting Vehs           | 206   | 220   | 220   | 209   |
| Ending Vehs             | 196   | 193   | 217   | 197   |
| Travel Distance (mi)    | 4979  | 4968  | 5079  | 4983  |
| Travel Time (hr)        | 212.5 | 219.2 | 224.4 | 215.8 |
| Total Delay (hr)        | 88.2  | 95.0  | 97.6  | 91.3  |
| Total Stops             | 5414  | 5731  | 5827  | 5566  |
| Fuel Used (gal)         | 192.6 | 194.7 | 199.0 | 193.9 |

### Interval #0 Information Seeding

|                                     |      |
|-------------------------------------|------|
| Start Time                          | 4:45 |
| End Time                            | 5:00 |
| Total Time (min)                    | 15   |
| Volumes adjusted by Growth Factors. |      |
| No data recorded this interval.     |      |

**Interval #1 Information Int 1**

Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1459 | 1499 | 1590 | 1502 | 1434 | 1450 | 1425 |
| Vehs Exited          | 1483 | 1490 | 1605 | 1494 | 1444 | 1452 | 1414 |
| Starting Vehs        | 213  | 202  | 223  | 211  | 199  | 211  | 200  |
| Ending Vehs          | 189  | 211  | 208  | 219  | 189  | 209  | 211  |
| Travel Distance (mi) | 1180 | 1230 | 1271 | 1221 | 1172 | 1198 | 1172 |
| Travel Time (hr)     | 50.0 | 53.3 | 56.6 | 52.4 | 49.0 | 52.0 | 49.5 |
| Total Delay (hr)     | 20.6 | 22.6 | 24.7 | 21.8 | 19.6 | 22.0 | 20.2 |
| Total Stops          | 1308 | 1389 | 1448 | 1375 | 1238 | 1317 | 1278 |
| Fuel Used (gal)      | 46.2 | 48.0 | 50.2 | 47.0 | 45.2 | 45.9 | 44.9 |

**Interval #1 Information Int 1**

Start Time 5:00

End Time 5:15

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1538 | 1487 | 1530 | 1488 |
| Vehs Exited          | 1546 | 1506 | 1551 | 1499 |
| Starting Vehs        | 206  | 220  | 220  | 209  |
| Ending Vehs          | 198  | 201  | 199  | 203  |
| Travel Distance (mi) | 1240 | 1190 | 1245 | 1212 |
| Travel Time (hr)     | 52.7 | 52.1 | 54.8 | 52.3 |
| Total Delay (hr)     | 21.6 | 22.4 | 23.8 | 21.9 |
| Total Stops          | 1347 | 1367 | 1404 | 1349 |
| Fuel Used (gal)      | 47.8 | 47.1 | 48.5 | 47.1 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1689 | 1573 | 1681 | 1668 | 1619 | 1687 | 1578 |
| Vehs Exited          | 1653 | 1565 | 1652 | 1639 | 1568 | 1667 | 1597 |
| Starting Vehs        | 189  | 211  | 208  | 219  | 189  | 209  | 211  |
| Ending Vehs          | 225  | 219  | 237  | 248  | 240  | 229  | 192  |
| Travel Distance (mi) | 1330 | 1283 | 1365 | 1341 | 1303 | 1368 | 1283 |
| Travel Time (hr)     | 58.3 | 55.1 | 60.8 | 60.7 | 57.5 | 60.0 | 56.3 |
| Total Delay (hr)     | 25.0 | 23.2 | 26.7 | 27.3 | 25.2 | 25.9 | 24.4 |
| Total Stops          | 1483 | 1407 | 1563 | 1565 | 1518 | 1570 | 1442 |
| Fuel Used (gal)      | 52.0 | 49.2 | 54.2 | 53.0 | 50.4 | 53.9 | 50.5 |

**Interval #2 Information Int 2**

|                  |      |
|------------------|------|
| Start Time       | 5:15 |
| End Time         | 5:30 |
| Total Time (min) | 15   |

Volumes adjusted by PHF, Growth Factors.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1633 | 1608 | 1682 | 1643 |
| Vehs Exited          | 1604 | 1569 | 1622 | 1613 |
| Starting Vehs        | 198  | 201  | 199  | 203  |
| Ending Vehs          | 227  | 240  | 259  | 233  |
| Travel Distance (mi) | 1316 | 1280 | 1363 | 1323 |
| Travel Time (hr)     | 58.1 | 57.3 | 61.6 | 58.6 |
| Total Delay (hr)     | 25.5 | 25.3 | 27.4 | 25.6 |
| Total Stops          | 1491 | 1516 | 1657 | 1519 |
| Fuel Used (gal)      | 51.8 | 50.6 | 54.0 | 52.0 |

**Interval #3 Information Int 3**

Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1502 | 1553 | 1456 | 1579 | 1484 | 1423 | 1471 |
| Vehs Exited          | 1524 | 1568 | 1505 | 1627 | 1527 | 1446 | 1473 |
| Starting Vehs        | 225  | 219  | 237  | 248  | 240  | 229  | 192  |
| Ending Vehs          | 203  | 204  | 188  | 200  | 197  | 206  | 190  |
| Travel Distance (mi) | 1208 | 1261 | 1197 | 1315 | 1234 | 1166 | 1186 |
| Travel Time (hr)     | 53.9 | 54.3 | 50.3 | 56.7 | 52.5 | 49.4 | 49.3 |
| Total Delay (hr)     | 23.5 | 22.7 | 20.3 | 24.0 | 21.8 | 20.4 | 19.6 |
| Total Stops          | 1436 | 1393 | 1260 | 1410 | 1373 | 1289 | 1297 |
| Fuel Used (gal)      | 47.8 | 49.1 | 45.8 | 51.1 | 48.1 | 44.8 | 45.2 |

**Interval #3 Information Int 3**

Start Time 5:30

End Time 5:45

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1482 | 1556 | 1499 | 1499 |
| Vehs Exited          | 1524 | 1580 | 1554 | 1534 |
| Starting Vehs        | 227  | 240  | 259  | 233  |
| Ending Vehs          | 185  | 216  | 204  | 193  |
| Travel Distance (mi) | 1221 | 1296 | 1232 | 1232 |
| Travel Time (hr)     | 50.7 | 57.5 | 52.8 | 52.7 |
| Total Delay (hr)     | 20.2 | 25.2 | 22.2 | 22.0 |
| Total Stops          | 1283 | 1501 | 1318 | 1356 |
| Fuel Used (gal)      | 46.5 | 50.3 | 47.8 | 47.6 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 1    | 10   | 2    | 3    | 4    | 5    | 6    |
|----------------------|------|------|------|------|------|------|------|
| Vehs Entered         | 1458 | 1486 | 1553 | 1504 | 1581 | 1492 | 1479 |
| Vehs Exited          | 1436 | 1503 | 1541 | 1512 | 1563 | 1497 | 1503 |
| Starting Vehs        | 203  | 204  | 188  | 200  | 197  | 206  | 190  |
| Ending Vehs          | 225  | 187  | 200  | 192  | 215  | 201  | 166  |
| Travel Distance (mi) | 1179 | 1184 | 1248 | 1213 | 1282 | 1214 | 1198 |
| Travel Time (hr)     | 50.5 | 48.6 | 53.6 | 52.0 | 55.9 | 53.2 | 50.0 |
| Total Delay (hr)     | 21.0 | 19.1 | 22.4 | 21.8 | 23.7 | 22.7 | 20.0 |
| Total Stops          | 1329 | 1228 | 1389 | 1369 | 1418 | 1360 | 1244 |
| Fuel Used (gal)      | 45.8 | 45.3 | 48.8 | 47.2 | 49.6 | 47.8 | 46.2 |

**Interval #4 Information Int 4**

Start Time 5:45

End Time 6:00

Total Time (min) 15

Volumes adjusted by Growth Factors, Anti PHF.

| Run Number           | 7    | 8    | 9    | Avg  |
|----------------------|------|------|------|------|
| Vehs Entered         | 1465 | 1464 | 1549 | 1502 |
| Vehs Exited          | 1454 | 1487 | 1536 | 1503 |
| Starting Vehs        | 185  | 216  | 204  | 193  |
| Ending Vehs          | 196  | 193  | 217  | 197  |
| Travel Distance (mi) | 1201 | 1202 | 1239 | 1216 |
| Travel Time (hr)     | 51.0 | 52.3 | 55.3 | 52.2 |
| Total Delay (hr)     | 20.9 | 22.1 | 24.3 | 21.8 |
| Total Stops          | 1293 | 1347 | 1448 | 1343 |
| Fuel Used (gal)      | 46.4 | 46.7 | 48.7 | 47.3 |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | EB  | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB   | WB   | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | L   | T   | T   | T   | R   | L   | T    | T    | T    | R    | L   |
| Maximum Queue (ft)    | 162 | 144 | 233 | 227 | 222 | 39  | 155 | 324  | 363  | 373  | 67   | 126 |
| Average Queue (ft)    | 79  | 67  | 141 | 125 | 96  | 6   | 69  | 154  | 183  | 201  | 29   | 29  |
| 95th Queue (ft)       | 139 | 127 | 212 | 214 | 190 | 23  | 132 | 276  | 315  | 329  | 61   | 94  |
| Link Distance (ft)    | 208 | 208 | 208 | 208 | 208 | 208 |     | 2388 | 2388 | 2388 | 2388 |     |
| Upstream Blk Time (%) | 0   | 0   | 1   | 1   | 0   |     |     |      |      |      |      |     |
| Queuing Penalty (veh) | 0   | 0   | 2   | 2   | 1   |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     |     |     |     |     | 425 |      |      |      |      | 80  |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      |      |      | 0   |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      | 1   |

Intersection: 1: Commerce Pkwy/Plantation Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | LT  | R   | L    | LT   | R   |
| Maximum Queue (ft)    | 216 | 195 | 199  | 202  | 116 |
| Average Queue (ft)    | 90  | 100 | 126  | 112  | 49  |
| 95th Queue (ft)       | 176 | 179 | 186  | 182  | 92  |
| Link Distance (ft)    | 206 |     | 1391 | 1391 |     |
| Upstream Blk Time (%) | 1   | 0   |      |      |     |
| Queuing Penalty (veh) | 2   | 0   |      |      |     |
| Storage Bay Dist (ft) |     | 215 |      | 256  |     |
| Storage Blk Time (%)  | 16  | 0   |      | 0    |     |
| Queuing Penalty (veh) | 50  | 0   |      | 0    |     |

Intersection: 2: Commerce Pkwy & Driveway 2

| Movement              | EB  | NB  | SB  |
|-----------------------|-----|-----|-----|
| Directions Served     | LR  | LT  | TR  |
| Maximum Queue (ft)    | 111 | 31  | 2   |
| Average Queue (ft)    | 53  | 2   | 0   |
| 95th Queue (ft)       | 91  | 17  | 2   |
| Link Distance (ft)    | 156 | 924 | 206 |
| Upstream Blk Time (%) | 0   |     |     |
| Queuing Penalty (veh) | 0   |     |     |
| Storage Bay Dist (ft) |     |     |     |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

Intersection: 3: Driveway 1 & Warrenton Road (US 17)

| Movement              | EB | EB | EB | B17 | WB  | WB  |
|-----------------------|----|----|----|-----|-----|-----|
| Directions Served     | T  | T  | T  | T   | T   | T   |
| Maximum Queue (ft)    | 18 | 8  | 7  | 5   | 6   | 4   |
| Average Queue (ft)    | 1  | 0  | 0  | 0   | 0   | 0   |
| 95th Queue (ft)       | 8  | 9  | 8  | 4   | 6   | 3   |
| Link Distance (ft)    | 75 | 75 | 75 | 732 | 208 | 208 |
| Upstream Blk Time (%) | 0  | 0  |    |     |     |     |
| Queuing Penalty (veh) | 0  | 0  |    |     |     |     |
| Storage Bay Dist (ft) |    |    |    |     |     |     |
| Storage Blk Time (%)  |    |    |    |     |     |     |
| Queuing Penalty (veh) |    |    |    |     |     |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB | WB  | WB  | WB   | WB   | WB   | WB  | NB  |
|-----------------------|-----|------|------|------|----|-----|-----|------|------|------|-----|-----|
| Directions Served     | L   | T    | T    | T    | R  | L   | L   | T    | T    | T    | R   | LT  |
| Maximum Queue (ft)    | 123 | 224  | 228  | 223  | 1  | 39  | 91  | 382  | 351  | 310  | 9   | 130 |
| Average Queue (ft)    | 50  | 85   | 99   | 106  | 0  | 6   | 35  | 233  | 201  | 152  | 0   | 62  |
| 95th Queue (ft)       | 104 | 169  | 174  | 181  | 0  | 32  | 81  | 364  | 334  | 287  | 4   | 119 |
| Link Distance (ft)    |     | 2388 | 2388 | 2388 |    |     |     | 1184 | 1184 | 1184 |     | 680 |
| Upstream Blk Time (%) |     |      |      |      |    |     |     |      |      |      |     |     |
| Queuing Penalty (veh) |     |      |      |      |    |     |     |      |      |      |     |     |
| Storage Bay Dist (ft) | 375 |      |      |      |    | 350 | 520 | 520  |      |      | 235 |     |
| Storage Blk Time (%)  |     |      |      |      |    | 0   |     |      |      |      | 1   |     |
| Queuing Penalty (veh) |     |      |      |      |    | 0   |     |      |      |      | 0   |     |

Intersection: 9: Commuter Lot/Falls Run Dr & Warrenton Road (US 17)

| Movement              | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | R   | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 158 | 124 | 173 | 144 | 84  |
| Average Queue (ft)    | 71  | 18  | 97  | 44  | 29  |
| 95th Queue (ft)       | 131 | 69  | 161 | 125 | 59  |
| Link Distance (ft)    | 680 |     | 833 |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 220 |     | 340 | 340 |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

Queuing and Blocking Report  
Baseline

2022 Mitigated - PM  
08/31/2020

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | EB  | EB   | EB   | EB   | EB   | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R    | L   | L   | T   | T   | T   | R   | LT  |
| Maximum Queue (ft)    | 355 | 449  | 393  | 336  | 41   | 69  | 88  | 395 | 354 | 287 | 50  | 259 |
| Average Queue (ft)    | 185 | 263  | 230  | 180  | 9    | 16  | 41  | 220 | 180 | 142 | 10  | 109 |
| 95th Queue (ft)       | 315 | 399  | 354  | 301  | 31   | 48  | 77  | 359 | 301 | 243 | 32  | 210 |
| Link Distance (ft)    |     | 1092 | 1092 | 1092 | 1092 |     |     | 732 | 732 | 732 | 732 | 684 |
| Upstream Blk Time (%) |     |      |      |      |      |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |      |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 335 |      |      |      |      | 315 | 315 |     |     |     |     |     |
| Storage Blk Time (%)  | 0   | 2    |      |      |      |     |     | 2   |     |     |     | 2   |
| Queuing Penalty (veh) | 1   | 4    |      |      |      |     |     | 2   |     |     |     | 4   |

Intersection: 16: McWhirt Loop/Lichfield Blvd & Warrenton Road (US 17)

| Movement              | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | R   | L   | LT  | R   |
| Maximum Queue (ft)    | 192 | 128 | 126 | 148 |
| Average Queue (ft)    | 78  | 63  | 54  | 61  |
| 95th Queue (ft)       | 153 | 113 | 110 | 120 |
| Link Distance (ft)    |     | 464 | 464 |     |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 185 |     | 210 |     |
| Storage Blk Time (%)  | 1   |     |     |     |
| Queuing Penalty (veh) | 1   |     |     |     |

Network Summary

Network wide Queuing Penalty: 70